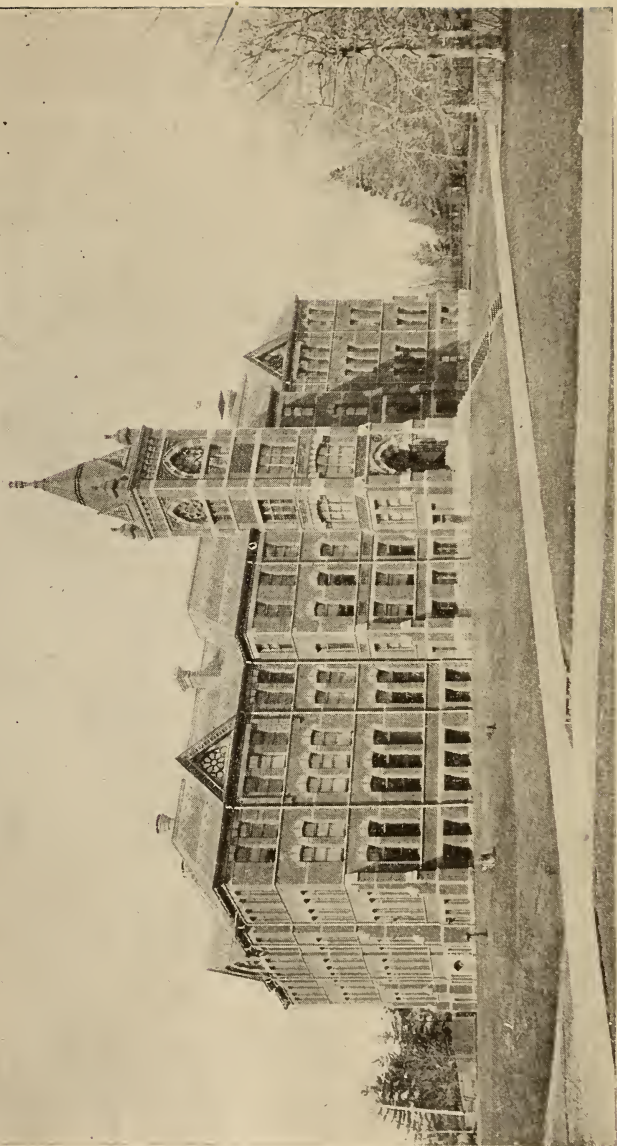


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89



SCHOOL OF PRACTICAL SCIENCE, TORONTO.

CALENDAR  
OF THE  
School of Practical Science  
OF THE  
Province of Ontario  
TORONTO

Affiliated to the University of Toronto



TWENTY-FIRST SESSION, 1898-1899.

40  
[1905]

*TORONTO*  
**WARWICK BRO'S & RUTTER**  
PRINTERS AND BINDERS

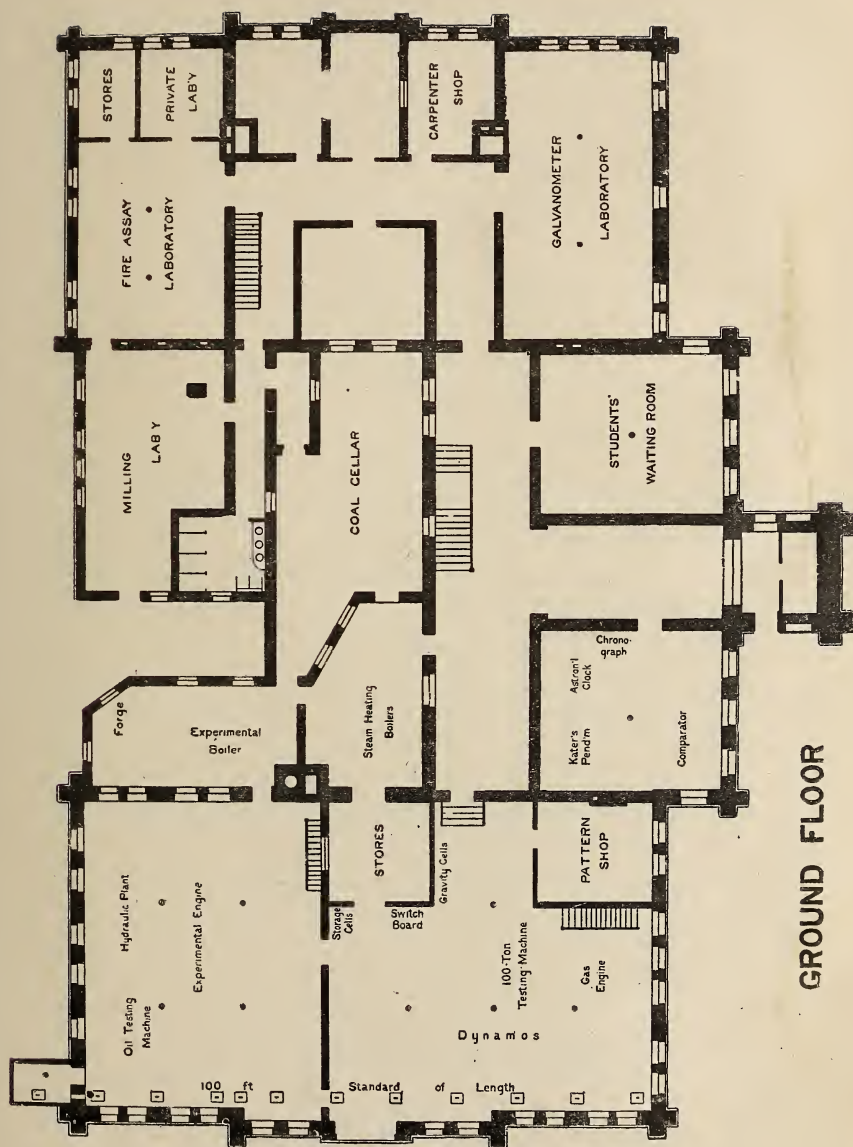


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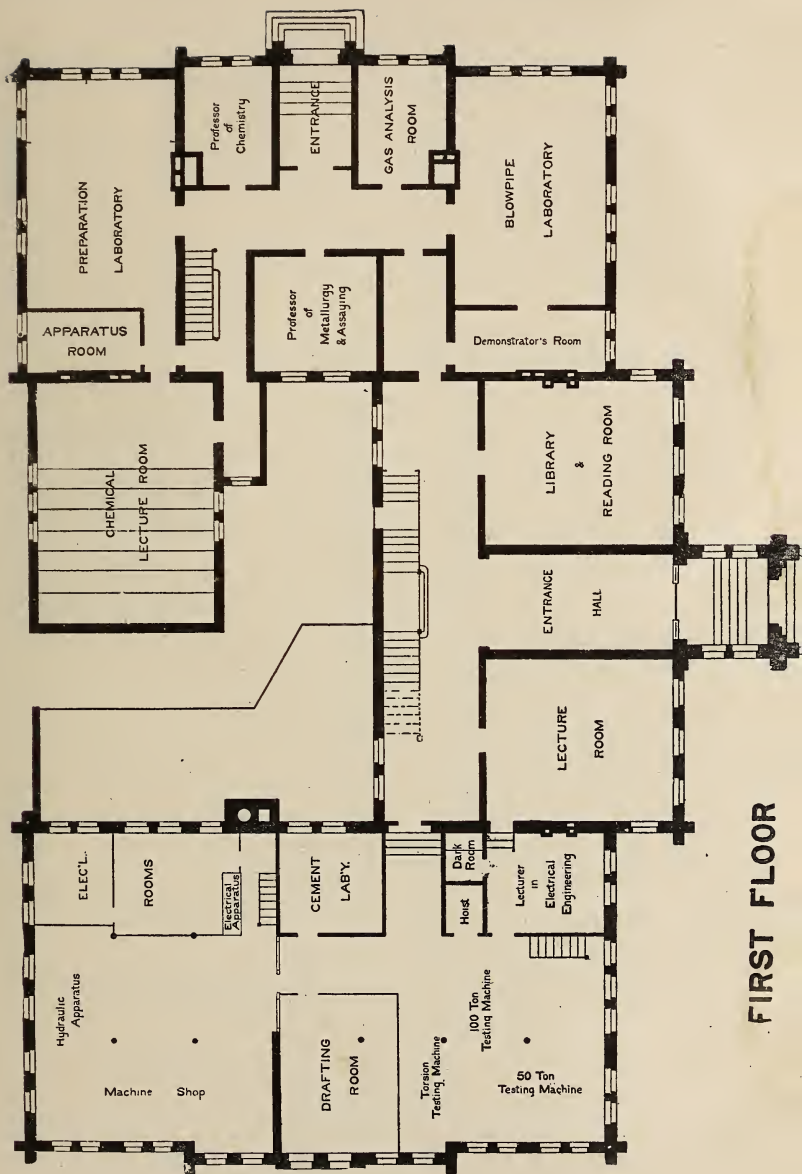
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GROUND FLOOR

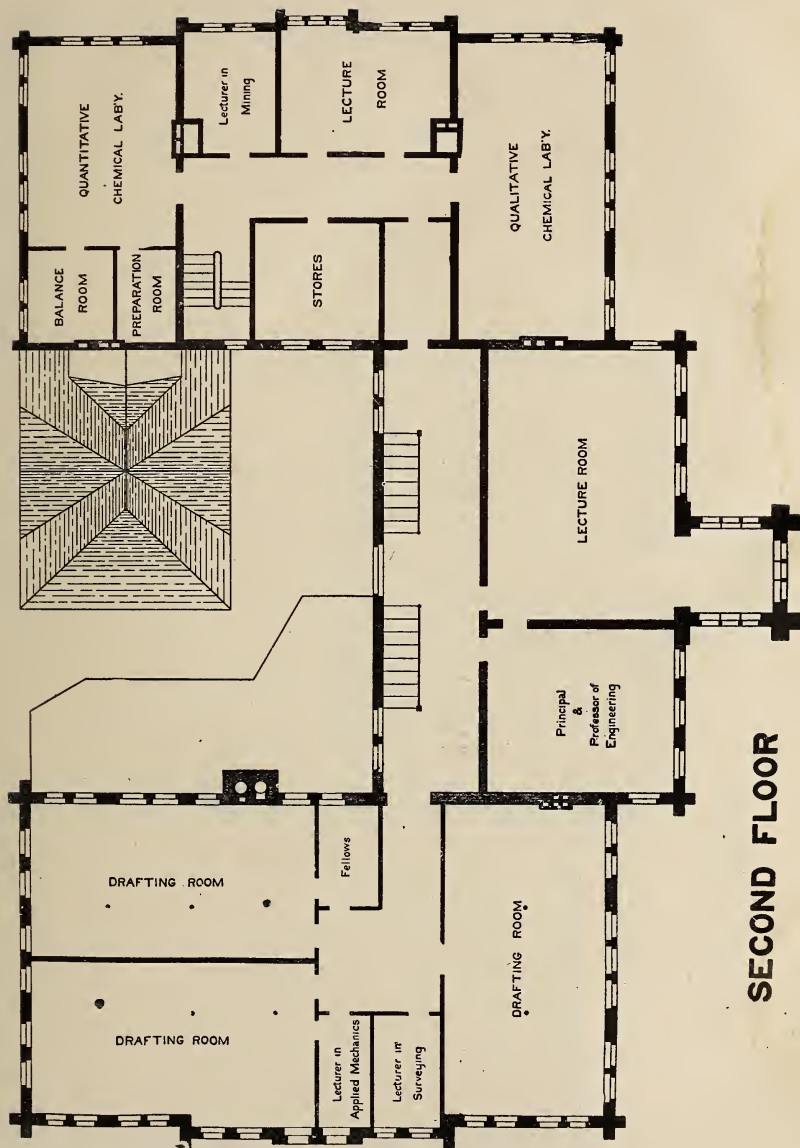






FIRST FLOOR

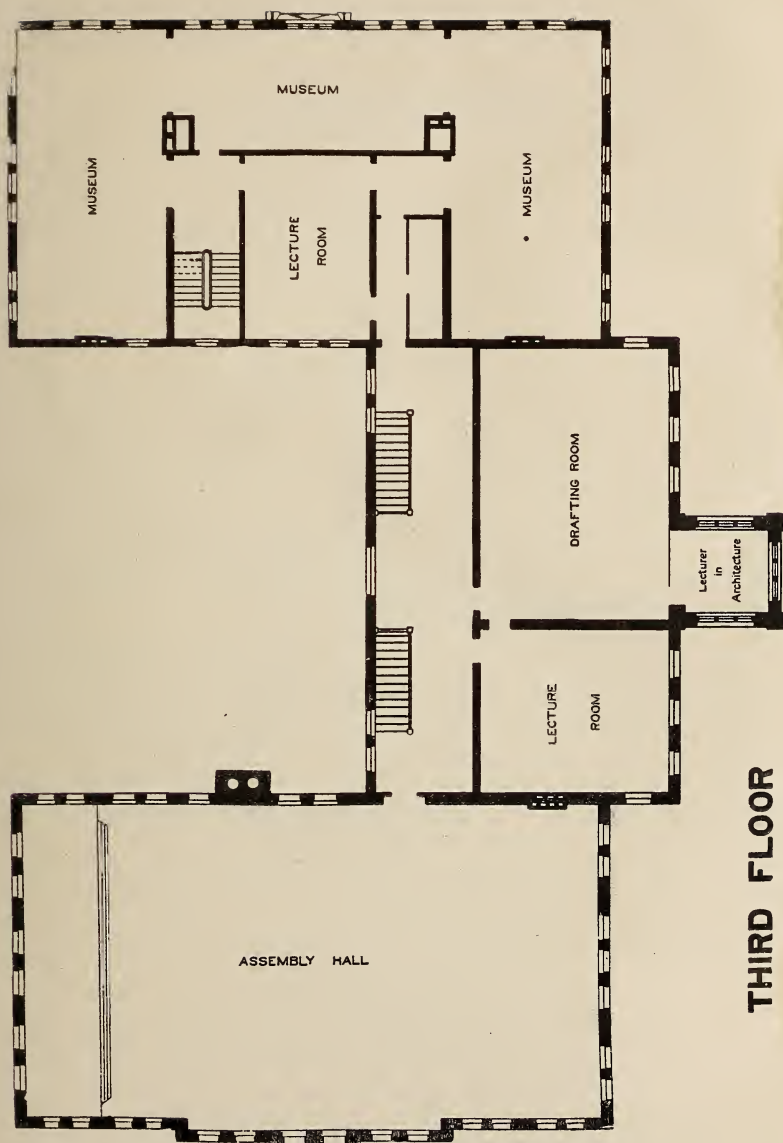




## SECOND FLOOR







## THIRD FLOOR



## ILLUSTRATIONS.

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---

# 1898.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

23. Meeting of Council.

29. Entrance Examinations begin.

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

1. **FIRST TERM** begins.

3. Vacation work to be handed in.

3. Supplemental Examinations begin.

14. Meeting of Council.

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

11. Meeting of Council.

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

9. Meeting of Council.

22. **FIRST TERM** ends.

# 1899.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	..
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

9. **SECOND TERM** begins.

13. Meeting of Council.

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	..	..	..	..
..	..	..	..	..	..	..

10. Meeting of Council.

15. Ash Wednesday. Building closed.

Black figures denote meetings of the Engineering Society.

# 1899

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

10. Meeting of Council.  
31. Good Friday. Building closed.

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

8. Lectures and Practical Work close  
10. Meeting of Council.  
15. Annual Examinations begin.

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

1. **SECOND TERM** ends.  
9. Examinations for B.A.Sc. begin.  
17. Meeting of Council.

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

Black figures denote meetings of the Engineering Society.

TIME TABLE—FIRST YEAR.  
SESSION 1898-99.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10 *Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11 *Electricity and Magn'm, 3, 5 (a) Drawing, 1, 2, 4 do 3, 5 (b)	Drawing. *Heat, (c)	Electricity, Drawing, 3, 5 (b) do. 1, 2, 4 3, 5 (a)	Drawing. *Heat, (c)	*Elect'y & Magn'm, 3, 5 (a) Electricity, 3, 5 (b) History of Arch'e, 4 Drawing, 1, 2	10-11
11-12 Drawing, 1, 2, 3, 4 Chemical Lab'y, 5	Chemistry	Chemistry.	Chemistry.	Pen and Ink, 4 Drawing, 1, 2, 3, 5	11-12
12-1 Statics, 1, 2, 3, 4 do. 5 (a) Chemical Lab'y, 5 (b)	Dynamics.	Descriptive Geometry.	Surveying, Drawing, 1, 2, 3, 4 5	Statics, do. 1, 2, 3, 4 5 (a)	12-1

# TIME TABLE.

2-3	Chemical Lab'y, 2, 5 Drawing, 1, 3, 4	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 1, 4, 5 Drawing, 2, 3	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Drawing, 1, 2, 3, 4 (b)	2-3
3-4	Chemical Lab'y, 2, 5 Drawing, 1, 3, 4	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 1, 4, 5 Drawing, 2, 3	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Drawing, 1, 2, 3, 4 (b)	3-4
4-5	Chemical Lab'y, 2, 5 Drawing, 1, 3 History of Arch'e, 4	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 1, 4, 5 Drawing, 2, 3	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Drawing, 1, 2, 3, 4 (b)	4-5

1. Civil Engineering ; 2, Mining Engineering ; 3, Mechanical and Electrical Engineering ; 4, Architecture ; 5, Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. (c) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The drafting rooms will be open for work on Saturday morning from 9 to 12, after Thanksgiving day.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drafting during the hours allotted to Physics.



## TIME TABLE—SECOND YEAR.

SESSION 1898-99.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Rigid Dynamics, 1, 2, 3 History of Arch'te, 4	Surveying (Lect.) 1, 2, 4 Electricity, 3	*Calculus, 1, 2, 3, 4	*Astronomy, 1 Lithology, 2 (a) Electricity, 3 Drawing, 4.—2 (b)	*Calculus, 1, 2, 3, 4	9-10
10-11	*Optics Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	*Hydrostatics, Metallurgy, (b) (a)	Descriptive Geo. 1, 2, 3, 4	*Hydrostatics, Metallurgy, (b) (a)	*Optics, Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	10-11
11-12	*Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mech'ism. 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y, 3	*Inorganic Chem'y, 5 Pen and Ink, Drawing, 1, 2, 3	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Strength of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1



# TIME TABLE.

19

2-3	Mineralogical Lab'y, 1, 2 Electrical Lab'y, 3, 4 Drawing, 4	Applied Chemistry. 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 3 (b) Drawing, 3	*Physical Lab'y, 3, 5 (a) Orders of Architecture, 1, 2 do. 3 (b)	Applied Chemistry.	*Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3, 4 (b)	2-3
3-4	Mineralogical Lab'y, 1, 2 Electrical Lab'y, 3, 4 Drawing, 4	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 3 (b) Drawing, 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 (b) do. 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3, 4 (b)	3-4
4-5	Mineralogical Lab'y, 1, 2 Electrical Lab'y, 3, 4 Drawing, 4	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 3 (b) Drawing, 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 (b) do. 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3 (b) Ornament, 4	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. \* University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The drafting rooms will be open for work on Saturday morning from 9-12 after Thanksgiving Day.

The work in the Physical laboratory closes for department 2 on November 25, and for department 1 on February 3, after which the students in these departments are expected to take drafting during the hours allotted to Physics

## TIME TABLE—THIRD YEAR.

SESSION 1898-99.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	*Biology, Thermodynamics, 1, 2, 3, 4 Drawing,	Hydraulics, 1, 2, 3, 4	*Biology, Thermodynamics, 1, 2, 3 History of Architecture, 4	Hydraulics, 1, 2, 3, 4	*Biology, Compound Stress, 1, 3, 4 Mining and Ore Dressing, 2	9-10
10-11	Drawing, 1, 2, 3, 4	Astronomy and Geodesy, 1 Electricity, 3 Drawing, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 1, 3, 4	Astronomy, Mechanics of Machinery, 3 Principles of Dec'n, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Drawing, 1, 2, 3, 4	10-11
11-12	Drawing, 1, 2, 3 History of Architecture, 4	Constructive Design, 1, 4 do. 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 3, 4	Constructive Design, 1, 4 do. 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Machine Design, 3 Drawing, 1, 2, 4	11-12
12-1	Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Drawing,	Constructive Design, 1, 2, 3, 4 (a) Assaying, 2 (b) Machine Design, 3 (b) Drawing, 1, 4 (b)	Mineralogy and Geology, 1, 2, 4, 5 Drawing,	Applied Chemistry.	12-1

# TIME TABLE.

2-3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2 do. 3 (b) Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Metallurgy, 2, 3, 5 (b) Drawing, 1, 4 (b)	Descriptive Geometry, 1, 2, 3, 4 (a) Theory of Least Squares, 1, 3 (b) Chemistry, 2 (b) Drawing, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Metallurgy, 2, 3, 5 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do. 1, 4 (b) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3 (b)	2-3
3-4	*Physical Lab'y, 3 (a) *Organic Chemistry, 5 Drawing, 1, 2, 4 do. 3 (b)	*Organic Chemistry, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3 do. 4 (a) Chemistry, 2 Pen and Ink, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do. 1, 4 (b) Chemical Lab'y, 2 (b) Organic Chemistry, 5 Field Work, 1, 2, 4 (a) Drawing, 3 (b)	3-1
4-5	*Physical Lab'y, 3, 5 (a) Surveying, 1, 2, 4 (a) (Lect.), 1, 2, 3, 4 (b) Drawing, 1, 2, 3, 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 Chemistry, 2	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do. 1, 4 (b) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 3 (b)	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry; \* University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories. The drafting rooms will be open for work on Saturday mornings from 9-12 after Thanksgiving Day. The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take draughting during the hours allotted to Physics.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such intervals as suit the laboratory work.

## FACULTY OF THE SCHOOL.

## PRINCIPAL.

J. GALBRAITH, M.A., M. Can. Soc. C.E.

## MEMBERS OF THE COUNCIL.

J. GALBRAITH, M.A., M. Can. Soc. C.E.,  
Professor of Engineering (Chairman).

W. HODGSON ELLIS, M.A., M.B.,  
Professor of Applied Chemistry.

A. P. COLEMAN, M.A., Ph.D.,  
Professor of Assaying and Metallurgy.

L. B. STEWART, O.L.S., D.T.S.,  
Lecturer in Surveying (Secretary).

C. H. C. WRIGHT, B.A.Sc.,  
Lecturer in Architecture.

T. R. ROSEBRUGH, M.A.,  
Lecturer in Electrical Engineering.

J. A. DUFF, B.A., A.M. Can. Soc. C.E.,  
Lecturer in Applied Mechanics.

G. R. MICKLE, B.A.,  
Lecturer in Mining.

## ASSISTANT INSTRUCTORS.

J. KEELE, B.A.Sc.,  
Acting Demonstrator in Civil Engineering.

A. T. LAING, B.A.Sc.,  
Acting Demonstrator in Surveying.

W. MINTY, B.A.Sc.,  
Fellow in Mechanical Engineering.

R. W. ANGUS, B.A.Sc.,  
Fellow in Electrical Engineering.

ASSISTANT INSTRUCTORS.—*Continued.*

J. W. BAIN, B.A.Sc.,  
Fellow in Mining Engineering.

F. N. SPELLER, B.A.Sc.,  
Fellow in Chemistry.

MEMBERS OF THE FACULTY of the University of Toronto  
whose classes are attended by the Regular Students of the School.

JAMES LOUDON, M.A., LL.D.,  
President and Professor of Physics.

R. RAMSAY WRIGHT, M.A., B.Sc.,  
Professor of Biology.

W. H. PIKE, M.A., Ph.D.,  
Professor of Chemistry.

ALFRED BAKER, M.A.,  
Professor of Mathematics.

A. B. MCCALLUM, B.A., M.B., Ph.D.,  
Professor of Physiology.

W. J. LOUDON, B.A.,  
Demonstrator in Physics.

C. A. CHANT, B.A.,  
Lecturer in Physics.

J. C. MCLENNAN, B.A.,  
Assistant Demonstrator in Physics.

ALFRED T. DELURY, B.A.,  
Lecturer in Mathematics.

W. L. MILLER, B.A., Ph.D.,  
Demonstrator in Chemistry.

F. J. SMALE, B.A., Ph.D.,  
Lecturer in Chemistry.

W. J. RUSK, B.A.,  
Fellow in Mathematics.

For information further than that contained in the Calendar, application may be made to the Secretary, L. B. STEWART.



# SCHOOL OF PRACTICAL SCIENCE

PROVINCE OF ONTARIO

---

## CALENDAR FOR THE SESSION 1898-9.

---

THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments in science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz. :—

- 1 Civil Engineering (including Sanitary Engineering.)
2. Mining Engineering.
3. Mechanical and Electrical Engineering.



4. Architecture.

5. Analytical and Applied Chemistry.

The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

### DIPLOMA.

The regular course in each department is of three years' duration, and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

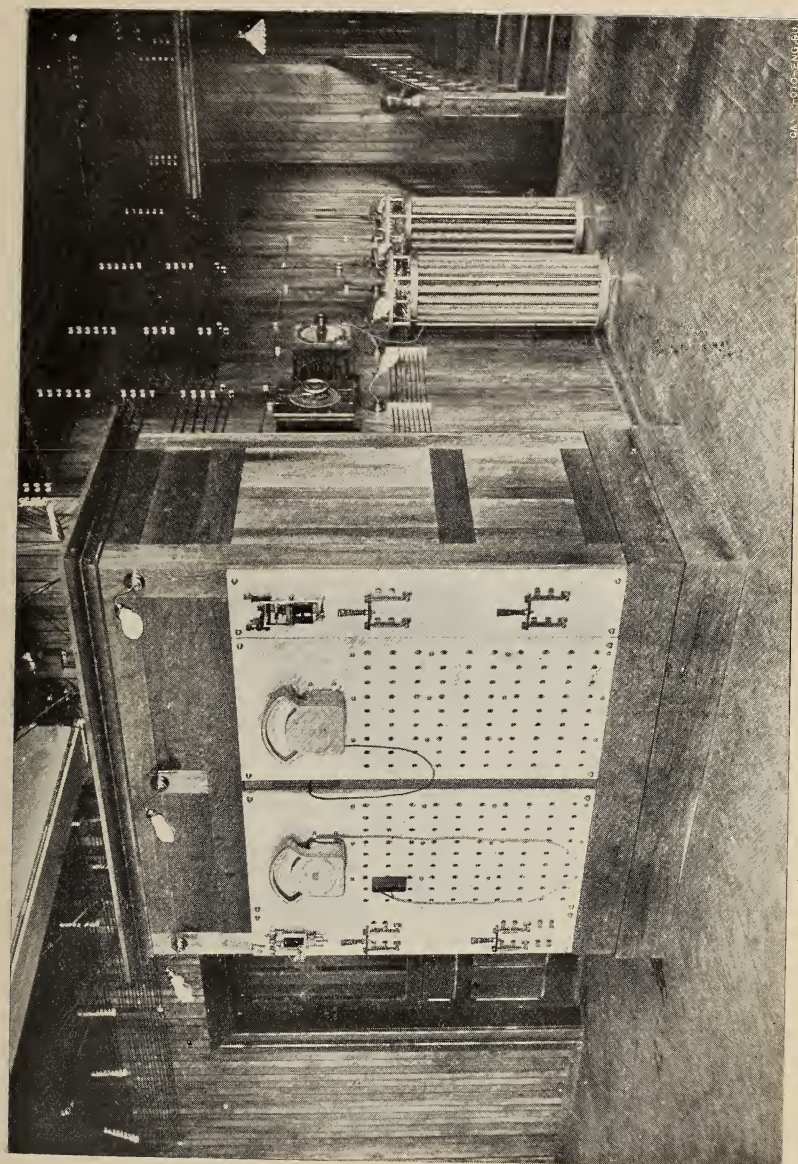
### THE DEGREE OF B.A.Sc.

After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.) or Electrical Engineer (E.E.), as the case may be, subject to the rules and regulations established by the University.

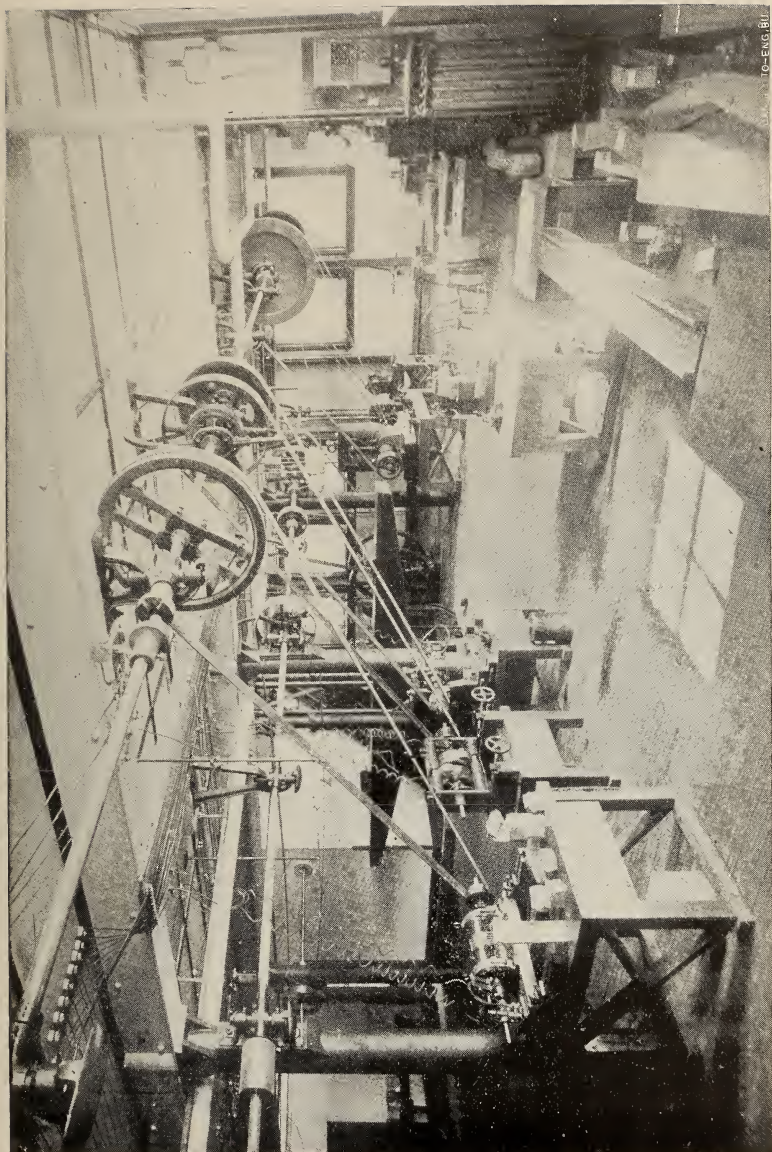




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SWITCH-BOARD.





DYNAMO ROOM.





# REGULATIONS

## RESPECTING THE

### School of Practical Science.

Approved by Colonel Sir Casimir Stanislaus Gzowski, K.C.M.G.,  
Administrator of the Government of the Province of Ontario, the  
30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.
2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this vacation shall be determined annually by the Council.
3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :
  - (1) Civil Engineering (including Sanitary Engineering).
  - (2) Mining Engineering.
  - (3) Mechanical and Electrical Engineering,
  - (4) Architecture.
  - (5) Analytical and applied chemistry.
4. The Regular Course for the Diploma of the School in each Department shall be three years.
5. Students may enter the Regular Course in any one of the above Departments, either (a) by presenting certificates of having passed the Matriculation Examination in any University in

Her Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (b) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects :

*Arithmetic.*—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

*Algebra.*—Elementary rules, easy factoring, highest common measure, lowest common multiple, square root, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

*Euclid.*—Books I., II. and III. ; deductions.

*English.*—Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.
7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.
8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.
9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.
10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.



*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
\_\_\_\_\_ has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School, all the requirements  
thereunto relating.*

*In witness, whereof we have signed this Diploma, at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
\_\_\_\_\_ One thousand eight hundred and \_\_\_\_\_  
and have caused the Seal of this School to be hereunto affixed*

L. S.

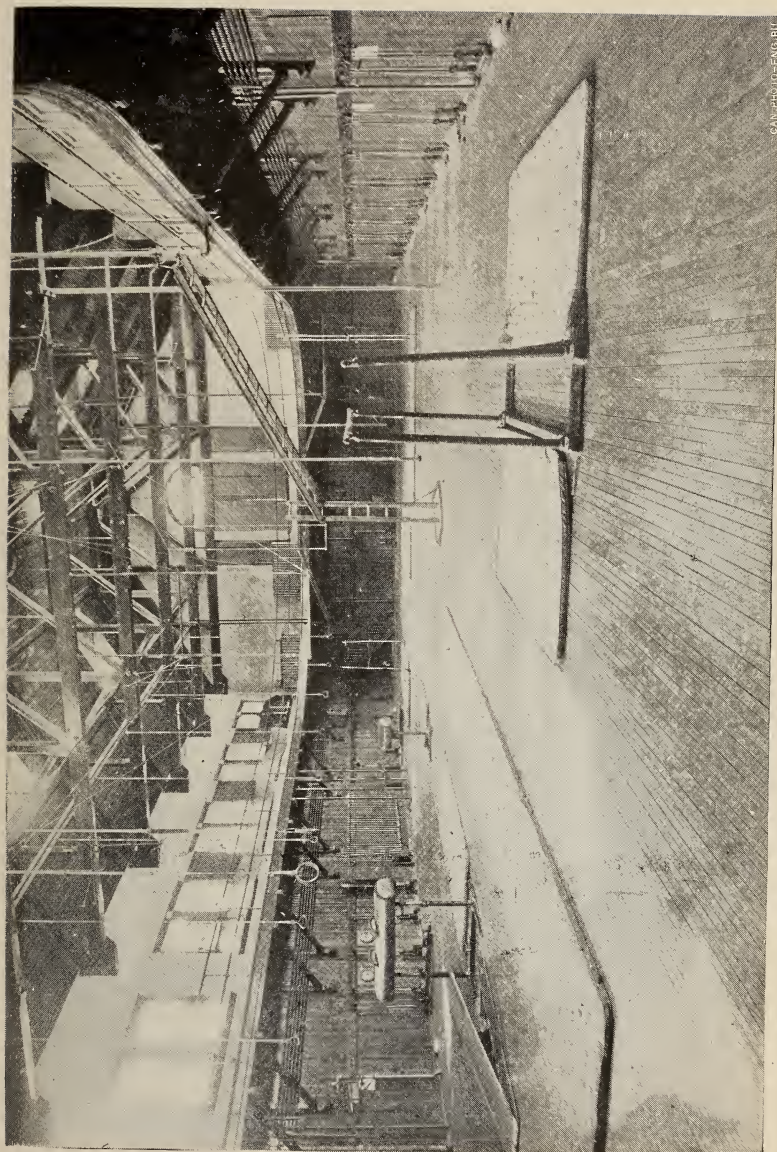
*Chairman.*

*Secretary*

[FORM OF DIPLOMA.]







CAN. PHOTO-ENG. CO.

GYMNASIUM (University of Toronto).



## ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, pp. 31 and 32.

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (b) order in Council, p. 32.

This examination will begin at 9 a.m. Thursday, September 29th, 1898.

Candidates are required to give the Secretary at least two weeks' notice in writing of their intention to take this examination.

## REGULAR COURSES FOR THE DIPLOMA.

See regulations pp. 31 and 32.

The following are the Departments in which the Diploma is granted :—

- (1) Civil Engineering (including Sanitary Engineering).
- (2) Mining Engineering.
- (3) Mechanical and Electrical Engineering.
- (4) Architecture.
- (5) Analytical and Applied Chemistry.

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

YEAR.	DESCRIPTION OF PAYMENT.	1.	2.	3.	4.	5.
		Civil Engineering.	Mining Engineering.	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
I.		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
	Payable in First Term—					
	Sessional Fees.....	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Physical Laboratory....	.....	.....	1 00	... ..	1 00
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory ...	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	.....	.....	.....	.....	.....
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees.....	35 00	35 00	35 00	35 00	35 00
	Total .....	75 00	75 00	76 00	75 00	76 00
II.	Payable in First Term—					
	Sessional Fees.....	39 00	39 00	39 00	39 00	39 00
	Dues—					
	Physical Laboratory....	1 50	1 50	1 50	1 00	1 50
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory ...	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 50	49 50	46 50	46 00	49 50
	Payable in Second Term—					
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00
	Total .....	89 50	89 50	86 50	86 00	89 50

YEAR.	DESCRIPTION OF PAYMENT.	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
III.	Payable in First Term—					
	Sessional Fees.....	44 00	44 00	44 00	44 00	44 00
	Dues—					
	Physical Laboratory....	1 00	.....	3 00	2 00	3 00
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory ...	.....	3 00	.....	.....	3 00
	Minerological Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	50 00	49 00	56 00
	Payable in Second Term—					
	Sessional Fees....	45 00	45 00	45 00	45 00	45 00
	Total .....	93 00	98 00	95 00	94 00	101 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows:

Payable in First Term—

Sessional Fees..... \$35 00

Dues, Library .....

1 00

Deposits, General..... 2 00

Payable in Second Term—

Sessional Fees..... 34 00

University Fees .....

20 00

Total ..... \$92 00

Fourth year students must also pay the deposits of the laboratories in which they work.



**OCCASIONAL STUDENTS.**—The fees payable by occasional students depend upon the nature and the amount of work taken; they must be paid within one month from registration. All occasional students are required to pay the library fee, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

**CERTIFICATES.**—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established, open to graduates of the school: Civil Engineering, Mechanical Engineering, Electrical Engineering, Surveying, Metallurgy and Assaying, Analytical and Applied Chemistry.

Each fellowship is of the value of \$500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September.

### REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in October, notice in writing of their intention to take such examinations.

This regulation applies to all regular students and to such occasional students as may be candidates for certificates.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in Drawing the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserve the right of disposing of the drawings as they may think proper. No drawing may be removed from the School without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

### Vacation Work.

Vacation work must be handed in on or before October 3rd, 1898, otherwise it will not be counted.

Vacation notes must be on construction only, and consist of not less than twenty, nor more than thirty pages. The sketches must be free-hand pencil drawings and figured dimensions.

Theses must be written on ordinary foolscap, and consist of not less than twenty, nor more than thirty pages.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for the theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

### Supplemental Examinations, Etc.

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject, he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written



examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the second day of the session. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or theses indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time table.

### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, unless under such exceptional circumstances as may be deemed sufficient by the Council, which must be fully set forth in a formal petition.

### PRIZES.

The following prizes have been established :

Architecture, 1st Year, \$10 in books. Donor—Mr. D. B. Dick, Architect, Toronto.

Civil Engineering, 3rd Year, \$10 in books. Donor—Mr. T. Kennard Thomson, C.E., New York.

## HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS.

(APPROXIMATE LIST.)

## I Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Statics.
Euclid.	Dynamics.
Plane Trigonometry.	Descriptive Geometry.
Analytical Geometry...1, 2, 3, 4.	Surveying .....1, 2, 3, 4.
History of Architecture.....4.	Chemistry, Elementary,
Magnetism and Electricity..3, 5.	Electricity .....3, 5.
	Heat.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes.....1, 2, 4.
Construction Notes..1, 2, 3, 4.
Architectural Sketches.....4.
Experimental Physics ....3, 5.
Electricity, Practical.....3, 5.
Practical Chemistry.
French and German .....5.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

## II Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus . . . . .	1, 2, 3, 4.	Strength of Materials...	1, 2, 3, 4.
Astronomy . . . . .	1.	Rigid Dynamics . . . . .	1, 2, 3.
Optics.		Theory of Mechanism. . . . .	3.
Hydrostatics.		Descriptive Geometry.	1, 2, 3, 4.
Heat . . . . .	5.	Surveying . . . . .	1, 2, 4.
History of Architecture. . . . .	4.	Spherical Trigonometry.	1, 2, 3.
Orders of Architecture . . . . .	4.	Mineralogy & Geology.	1, 2, 4, 5.
History of Ornament. . . . .	4.	Lithology . . . . .	2.
Chemistry, Inorganic & Physical.	5.	Electricity . . . . .	3, 5.
Chemistry, Applied.		Metallurgy.	

## EXAMINATIONS HELD DURING THE SESSION.

Drawing . . . . .	1, 2, 3, 4.
Field Notes . . . . .	1, 2.
Construction Notes. . . . .	1, 2, 3, 4.
Architectural Sketches. . . . .	4.
Experimental Physics.	
Electricity, Practical. . . . .	3.
Thesis (at beginning of session).	
Chemistry, Practical.	
Mineralogy, Practical . . . . .	1, 2, 5.
French and German . . . . .	5.

## III Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity . . . . .	3.	Theory of Construction.	1, 2, 3, 4.
History of Architecture . . . . .	4.	Mechanics of Machinery . . . . .	3.
History of Ornament . . . . .	4.	Machine Design. . . . .	3.
Principles of Decoration . . . . .	4.	Hydraulics. . . . .	1, 2, 3, 4.
Method of Least Squares. . . . .	1, 3.	Thermodynamics . . . . .	1, 2, 3.

1. Civil Engineering.

3. Mechanical and Electrical Engineering.

2. Mining Engineering.

4. Architecture.

5. Analytical and Applied Chemistry.

Chemistry, Inorganic and Organic .....	5.	Descriptive Geometry.	1, 2, 3, 4.
Chemistry, Applied.		Practical Astronomy and Geodesy ...	1,
Mineralogy and Geology.	1, 2, 4, 5.	Surveying and Levelling.	1, 2.
Sanitary Plumbing, Heating and Ventilation .....	4.	Metallurgy .....	2, 3, 5.
Theory of Compound Stress, .....	1, 3, 4.	Mining and Ore Dressing ...	2.
		Ore Deposits .....	2.
		Assaying .....	2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing .....	1, 2, 3, 4.
Field Notes .....	1, 2.
Construction Notes.	1, 2, 3, 4.
Architectural Sketches.	4.
Experimental Physics.	1, 3, 4, 5.
Electricity, Practical .....	3.
Thesis (at beginning of session).	
Chemistry, Practical .....	2, 5.
Mineralogy, Determinative.	2, 5.
Assaying .....	2, 5.

## DEPARTMENT OF CIVIL ENGINEERING.

(INCLUDING SANITARY ENGINEERING.)

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers (including under this term Sanitary Engineers).

## I Year.

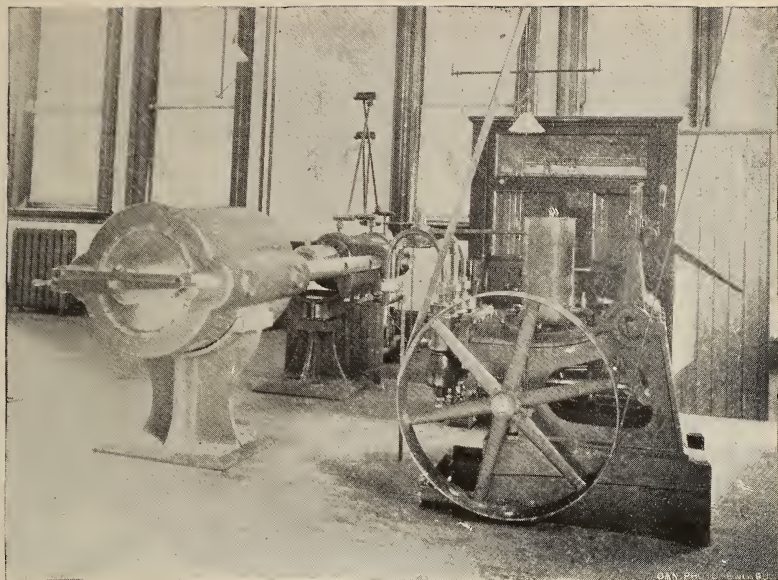
## MATHEMATICS.

Euclid, algebra, plane trigonometry.

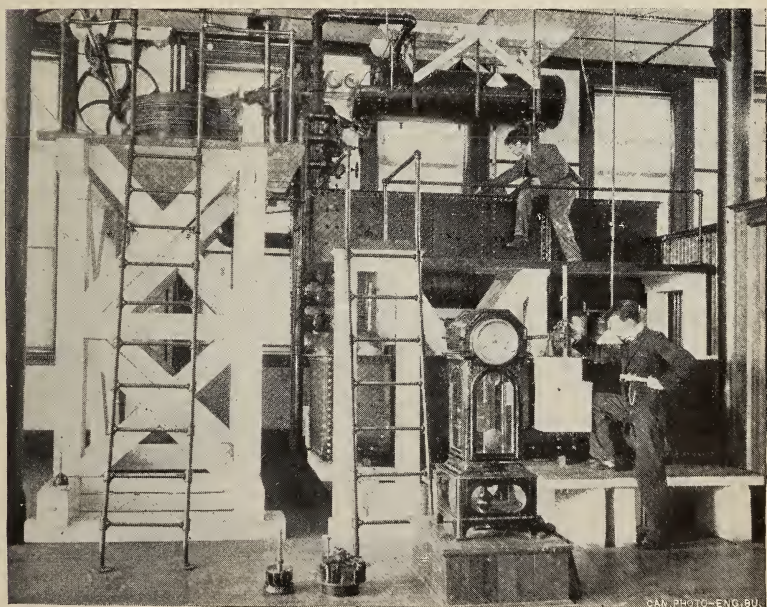
Analytical plane geometry.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |



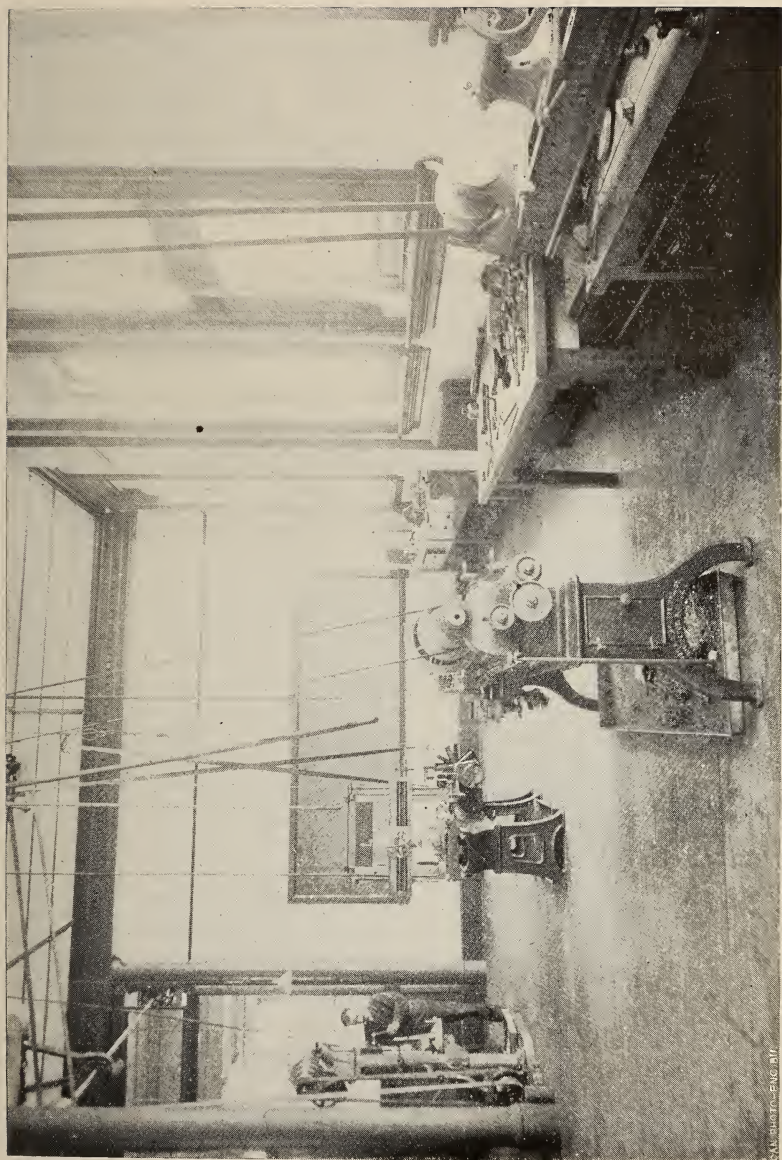


EMERY TESTING MACHINE.



HYDRAULIC PLANT.





MACHINE SHOP.

SAV. PHOTO. ENG. BUREAU





DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

MECHANICS.

Statics and dynamics (with special reference to structures and machines).

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction-

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY.

Chemistry of the metals.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location curves, etc.

Hydrographic surveying.

## MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 42 and 96.

## III. Year.

## DRAWING.

- Subjects of previous years continued.
- Descriptive geometry—shades and shadows, stone cutting, perspective projection.
- Original designs—bridges, roofs, floors, arches, etc.

## CHEMISTRY (Applied).

- Explosives.
- Artificial lighting.
- Photography.
- Industrial chemistry.
- Sanitary chemistry.

## ENGINEERING AND SURVEYING.

- Statics and dynamics (pure and applied).
- Strength and elasticity of materials.
- Theory of construction.
- Practical designs—Bridges, roofs, floors, arches, retaining walls, foundations, etc.
- Thermodynamics and theory of the steam engine.
- Hydraulics, sewerage, water supply.
- Experimental work in engineering laboratory.
- Levelling.
- Profiles, cross sections, field work and plotting.
- Computation of quantities.
- Mathematical theory of surveying instruments.
- Trigonometrical and barometrical levelling.
- Geodesy (considering the earth a sphere).
- Practical astronomy (treated in the manner required for the O.L.S. and D.L.S. examinations).
- Least squares.

## MINERALOGY AND GEOLOGY.

- Economic geology.

## EXPERIMENTAL PHYSICS.

- Heat.

## VACATION WORK.

- See pages 42 and 96.

## II. DEPARTMENT OF MINING ENGINEERING.

This Department is designed to afford the necessary preliminary training to students intending to become mining engineers.

### I. Year.

#### MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

#### DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

#### CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

#### MECHANICS.

Statics and dynamics (with special reference to structures and machines).

#### SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit theodolite, plotting, mensuration.

### II. Year.

#### MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes.)

CHEMISTRY.

Chemistry of the metals.

Thermo-chemistry.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location, curves, etc.

Mining surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

Lithology.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 42 and 96.

## III. Year.

## DRAWING.

Subjects of previous years continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

Laboratory practice.

Wet assays.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Thermodynamics and theory of steam engine.

Hydraulics.

Experimental work in engineering laboratory.

Levelling.

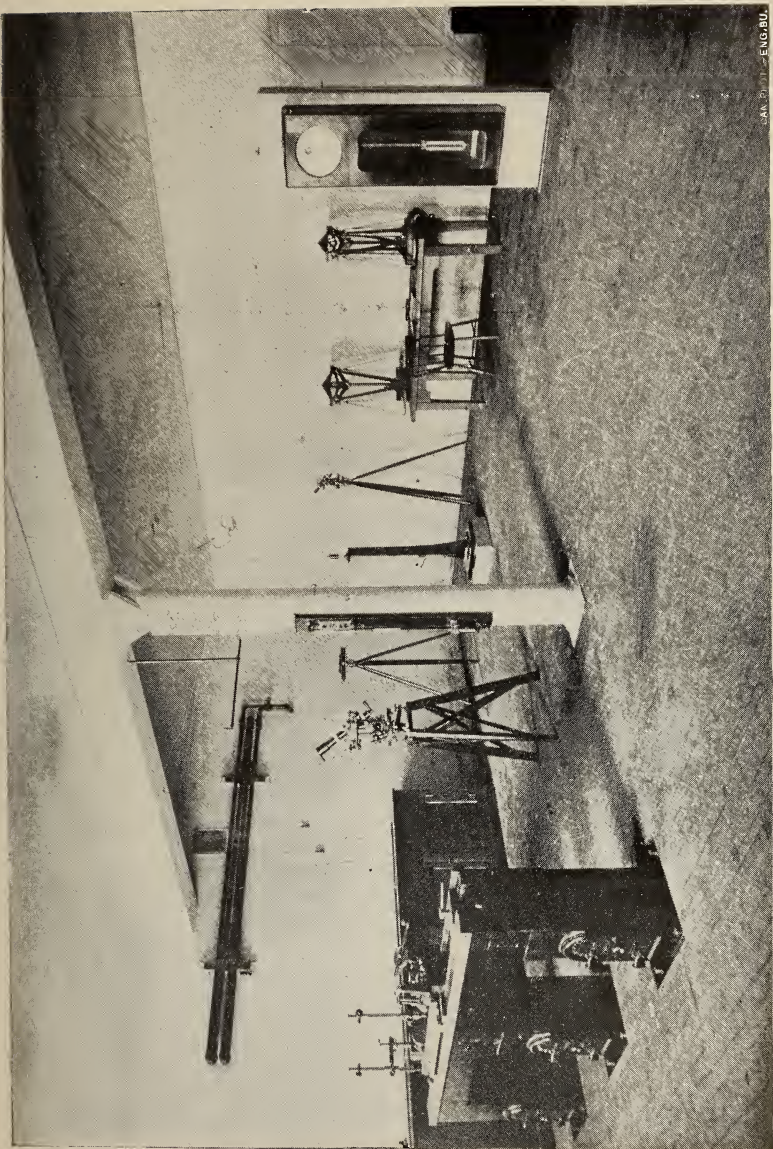
Profiles, cross-sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.





SAV. P. 171 - ENG. 8U.

CLOCK ROOM.







GALVANOMETER LABORATORY.



**MINERALOGY AND GEOLOGY.**

Economic geology.

Palæontology.

Ore deposits.

Blowpipe analysis and determinative mineralogy.

Metallurgy of gold, silver, nickel, copper, etc.

Mining and ore dressing.

Assaying.

**VACATION WORK.**

See pages 42 and 96.

**III. DEPARTMENT OF MECHANICAL AND ELECTRICAL  
ENGINEERING.**

This Department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers.

**I. Year.**

**MATHEMATICS.**

Euclid, algebra, plane trigonometry.

Analytical plane geometry,

**DRAWING.**

Copying from the flat, lettering, graphics.

Descriptive geometry in its application to plane-sided solids, orthographical (including isometrical) and oblique projection.

**CHEMISTRY.**

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

**MECHANICS.**

Statics and dynamics (with special reference to structures and machines).

## SURVEYING.

(Lectures only). Application of trigonometry and principles of measurement.

## PHYSICS.

Magnetism and electricity (introductory course).

Electricity (applications of the laws of Ohm, Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course.

## EXPERIMENTAL PHYSICS.

Introductory course.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere.

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY.

Chemistry of the metals.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING.

Statics and dynamics (pure and applied.)  
Theory of mechanism.  
Strength and elasticity of materials.  
Materials and construction.  
Methods and processes.  
Experimental work in engineering laboratory.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.  
Electrical measurements

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 42 and 96.

III. Year.

DRAWING.

Subjects of previous year continued.  
Descriptive geometry.  
Shades and shadows, stone cutting, perspective projection.

CHEMISTRY (APPLIED).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.

## ENGINEERING.

Subjects of previous years continued.

Applied Mechanics :

Mechanics of machinery, machine design, thermodynamics and theory of the steam engine, hydraulics.

Electricity.

Dynamos and motors.

Application of principles to practical problems connected with the design, construction and testing of various prime motors and machines.

Experimental work in engineering laboratory.

Least squares.

## METALLURGY.

Gold, silver, nickel, copper, lead.

## EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

## ELECTRICAL LABORATORY.

## ORIGINAL DESIGNS.

Engine and machine design.

## VACATION WORK.

See pages 42 and 96.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

#### IV. DEPARTMENT OF ARCHITECTURE.

This Department is designed to afford the necessary preliminary training to students intending to become Architects.

##### I. Year.

##### MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

##### DRAWING.

Copying from the flat, lettering, topography, graphics.

Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.

Rendering in pencil and pen and ink.

##### CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

##### MECHANICS.

Statics (with reference to structures).

Dynamics (preliminary to the study of hydraulics).

##### SURVEYING.

Principles, chain surveying, mensuration.

##### HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.



## II. Year.

## MATHEMATICS.

Differential and integral calculus.

## DRAWING.

Instrumental drawing, drawing from the cast, sketching  
and water color, pen and ink.

Descriptive geometry (curved surfaces).

## CHEMISTRY.

Chemistry of the metals.

Thermochemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## MECHANICS.

Statics (pure and applied).

Strength and elasticity of materials.

Materials of construction.

Experimental work in engineering laboratory.

## SURVEYING.

Use of transit and level.

Mensuration.

## MINERALOGY AND GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

## HISTORY OF ARCHITECTURE.

Greek and Roman.

Romanesque and Byzantine.

## ORDERS AND ELEMENTS OF ARCHITECTURE.

HISTORY OF ORNAMENT.

Ancient.

Classic—Greek, Roman.

VACATION WORK.

See pages 42 and 96.

III. Year.

DRAWING.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Water color sketching.

Original designs.—floors, trusses, arches, etc.

CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

HYDRAULICS.

SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

SURVEYING.

Levelling, setting out excavation, mensuration.

MINERALOGY AND GEOLOGY.

Economic geology.

EXPERIMENTAL PHYSICS.

Heat, acoustics.

HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

HISTORY OF ORNAMENT.

Early Christian ; Gothic and Renaissance.

PRINCIPLES OF DECORATION.

VACATION WORK.

See pages 42 and 96.

## V. DEPARTMENT OF ANALYTICAL AND APPLIED CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

Copying from the flat, lettering.

Descriptive geometry in its application to plane sided solids.

Orthographic (including isometric) and oblique projection.

Model drawing.

## CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

## MECHANICS.

Statics and Dynamics.

## PHYSICS.

Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

Introductory course.

## PRACTICAL ELECTRICITY.

Introductory course.

## MODERN LANGUAGES.

French.

German.

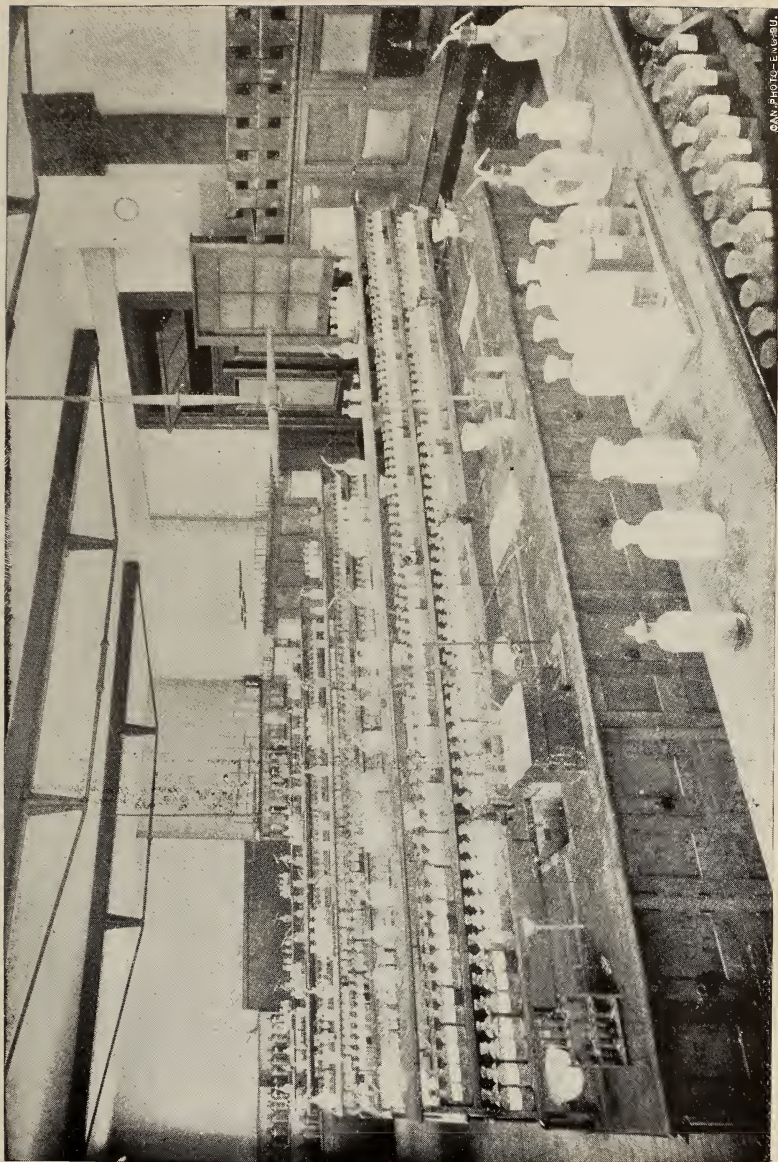
## II. Year.

## CHEMISTRY.

Inorganic and physical chemistry.

Applied chemistry.

Laboratory work in quantitative and qualitative analysis.



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CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.







CHEMICAL LABORATORY—QUANTITATIVE ANALYSIS.





MINERALOGY AND GEOLOGY.

Elementary mineralogy and blowpipe practice.  
Physical geography, palæontology and geology.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.  
Heat.  
Electricity.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

MODERN LANGUAGES.

Students in this and the following years are expected to  
be able to read chemical books in French and German.

VACATION WORK.

See pages 42 and 96.

III. Year.

CHEMISTRY.

Organic chemistry and chemical physics.  
Applied chemistry.  
Laboratory work.

MINERALOGY AND GEOLOGY.

Economic geology.  
Blowpipe analysis and determinative mineralogy.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

BIOLOGY.

VACATION WORK.

See pages 42 and 96.

## THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the School. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of optional and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the Honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and subdivisions :

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will not be allowed to take less than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year..... 900

Subdivided as follows :—

Work (reckoned in hours) ..... 540 marks

Records (notes, drawings, etc.) ..... 360 “

#### FOR PASS.

The minimum percentages are :

Work, 75 per cent..... 405 marks

Records, 50 “ ..... 180 “

And two-thirds of the total marks assigned. 600 “

#### FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statutes of the University of Toronto respecting the degree of B.A.Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they affect the degree of B.A.Sc.

### DEGREE OF B.A.Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations :

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.
3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.

## UNIVERSITY DEGREES.

4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all candidates who select group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent. of the marks assigned, will be required.

The degree with honors will be conferred on candidates who obtain three out of the four honors possible.

Viz.—Certificate with honors.....(cl. 2.)

Thesis with honors .....(cl. 3.)

Honors in each subject of examination.(cl. 4.)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in May.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of May.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.

10. The thesis, drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

### SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto.

*Be it enacted :*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degrees be hereby established, viz., Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), Electrical Engineer (E. E.).
- III. That the following be the conditions and regulations governing the conferring of the said degrees :
  1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause 11 hereunder.
  2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree.
  3. Intervals of non-employment or of employment in other branches of Engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
  4. Satisfactory evidence shall be submitted to the University Examiners as to the nature and length of the candidate's professional experience for the purposes of clauses 2 and 3.



The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications, and estimates.

The candidate may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the first day of May.
8. The candidate shall be required to present himself for examination in the month of May at such times as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the University.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.

For further information apply to the Registrar of the University of Toronto.

#### DOMINION AND ONTARIO LAND SURVEYORS.

Courses of instruction will be given in accordance with the requirements of the Statutes relating to the Dominion and Ontario Land Surveyors, which will enable the graduates to present themselves for final examination before the proper Boards, at an earlier period in their apprenticeship than would otherwise be permitted.

Extracts from the Provincial Act respecting Land Surveyors and Survey of Lands. (Cap. 152, R.S.O.)

"10.—(2) Any person serving as an apprentice as hereinbefore provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college, or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subjects required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practising Ontario Land Surveyor."

"14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such person shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practising land surveyor duly filed as required by section 17 of this Act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed.

"(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college, or university, the course of study in which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subjects required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practicing Ontario Land Surveyor."

## Extract from the Dominion Lands Act.

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one years' service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause.

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.

## Extracts from the Ontario Architects' Act.

"Any student who has matriculated in Arts in any University in Her Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

"23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

"24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

"(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture, to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Registrar upon payment of such fees as the council may, by regulation, direct."

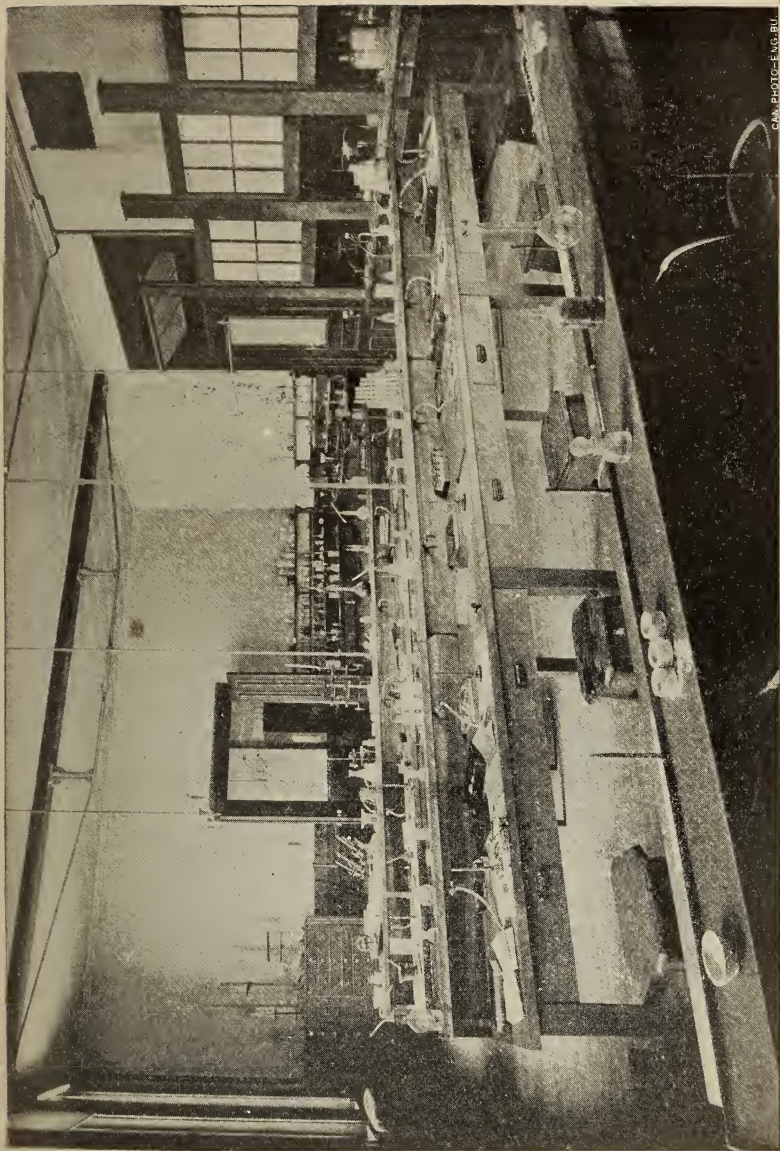
## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

Text-books for the first year marked (*a*) ; second year (*b*) ; third year (*c*) and for fourth or post graduate year (*d*).

### SUBJECTS TAUGHT BY THE FACULTY OF THE SCHOOL.

Subjects.	Instructors.
Organic and Inorganic Chemistry, Applied Chemistry.	W. H. Ellis, M.A., M.B., Professor.
	F. N. Speller, B.A.Sc., Fellow.
Mineralogy and Geology, Petrography, Metallurgy and Assaying, Mining and Ore-dressing, Milling, German.	A. P. Coleman, M.A., Ph., D., Professor.
Statics, Dynamics, Strength of Materials, Theory of Construction, Machine Design, Compound Stress, Hydraulics, Thermodynamics and Theory of the Steam Engine, French.	G. R. Mickle, B. A., Lecturer.
	J. W. Bain, B.A.Sc., Fellow.
Drawing, Architecture, Plumbing, Heating and Ventila- tion, Mortars and Cements, Brick and Stone Masonery.	J. Galbraith, M.A., Professor.
	J. A. Duff, B.A., Lecturer.
	W. Minty, B.A.Sc., Fellow.
Surveying, Geodesy and Astronomy, Spherical Trigonometry, Least Squares, Descriptive Geometry.	C. H. C. Wright, B.A.Sc., Lecturer.
Electricity, Magnetism, Dynamo-Electric Machinery, Theory of Mechanism.	Jos. Keele, B.A.Sc., Acting Demonstrator.
Mechanics of Machinery, Rigid Dynamics.	L. B. Stewart, D.T.S., Lecturer.
	A. T. Laing, B.A.Sc., Acting Demonstrator.
	T. R. Rosebrugh, M.A., Lecturer.
	R. W. Angus, B.A.Sc., Fellow.

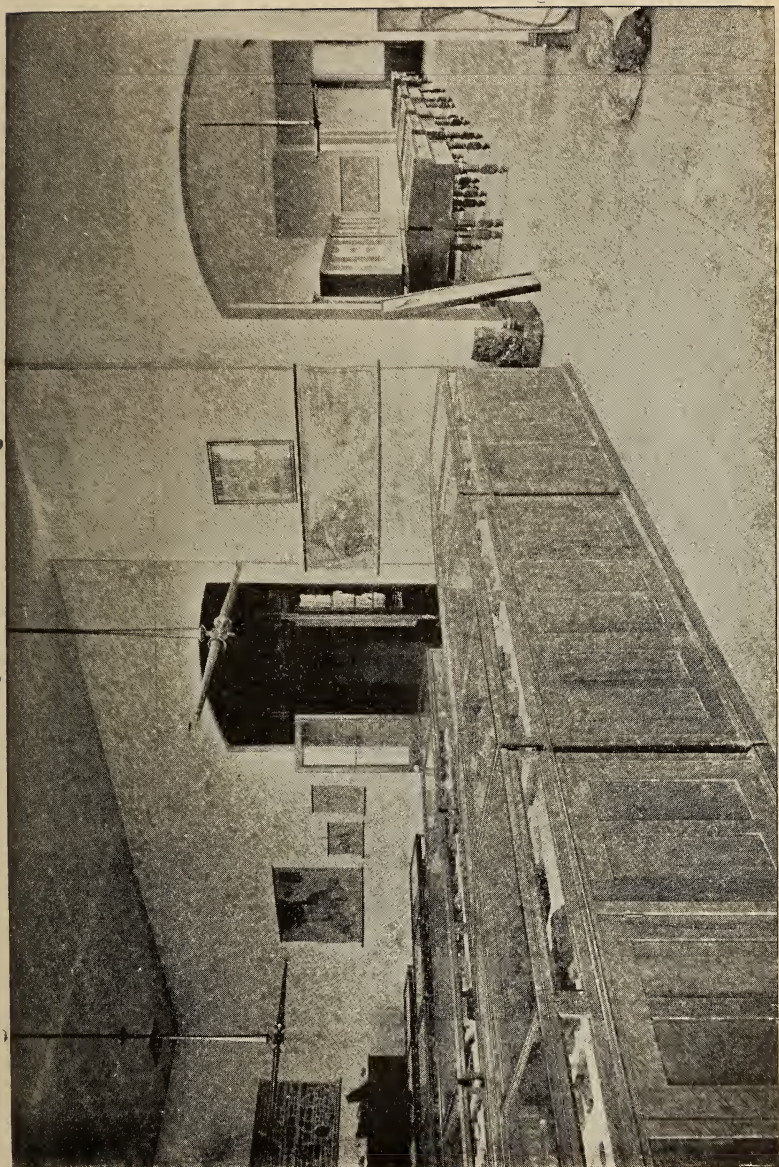




BLOWPIPE LABORATORY.







MINERALOGICAL COLLECTION.



# SUBJECTS TAUGHT BY THE FACULTY OF THE UNIVERSITY.

Algebra,	{	Alfred Baker, M.A., Professor.
Euclid,		A. T. DeLury, B.A., Lecturer.
Plane Trigonometry,		W. J. Rusk, B.A., Fellow.
Analytical Geometry,		
Calculus,		
Astronomy.	{	Jas. Loudon, M.A., LL.D., Professor.
Sound,		W. J. Loudon, B.A., Demonstrator.
Light, Heat,		C. A. Chant, B.A., Lecturer.
Electricity and Magnetism,		J. C. McLennan, B.A., Assistant Demonstrator.
Hydrostatics.		W. H. Pike, M.A., Ph.D., Professor.
Inorganic and Organic Chemistry,	{	W. L. Miller, B.A., Ph.D., Demonstrator.
Physical Chemistry.		F. J. Smale, B.A., Ph.D., Lecturer.

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

### Text-Books and Books of Reference.

- Angel—Plane and Solid Geometry.
- Binn—Orthographic Projection.
- Davidson—Projections.
- Low—Machine Drawing and Design.
- Millar—Descriptive Geometry, (a), (b).
- MacCord—Lessons in Mechanical Drawing.
- Reinhardt—Lettering for Draftsmen, Engineers and Students, (b), (c).
- Vere Foster—Copy Book No. 10, (a).
- Warren—Stone Cutting (c).
- Worthen—Topographical Drawing.

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

- Chain surveys.
- Compass and theodolite surveys.
- Method of keeping field notes.
- Determination of heights and distances.
- Plotting.

## LEVELLING.

- Longitudinal and cross sections.
- Plotting.

## SETTING OUT.

- Setting out straight lines and curves.
- Setting out levels.

## MENSURATION.

- Lines, surfaces and solids.
- Timber, masonry, iron and earthwork.
- Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

## Text-books.

- Brough—Mine Surveying (*b*), (*c*).
- Gillespie—Higher Surveying (*b*), (*c*), (*d*).
- Henck or Trautwine—Railway Curves (*b*), (*c*).
- Johnson—Theory and Practice of Surveying.
- Murray—Manual of Land Surveying (*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

## ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map constructions are based upon the supposition that the earth is a sphere.

#### ADVANCED COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors. It is distinguished from the work of the ordinary course not so much by the subjects as by the degrees of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

#### Text-Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher Surveying (*b*), (*c*), (*d*).

Gore—Elements of Geodesy (*c*), (*d*).

Green—Spherical and Practical Astronomy (*e*), (*d*).

Helmert—Hohere Geodesie.

Nautical Almanac, 1899 (*c*), (*d*).

#### APPLIED MECHANICS.

##### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

##### THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

##### THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—arches, retaining walls, roofs, bridges, etc.



## DYNAMICS.

- Representation and measurement of forces and motions.
- Principles of work and energy.
- Efficiency of machines. Friction.
- Transmission of energy—belts, shafts, crank and connecting rod, etc.
- Fly-wheels, governors.
- Balancing of machinery, etc., etc.

## STRENGTH OF THE PARTS OF MACHINES.

## MACHINE DESIGN—

## HYDRAULICS.

- Discharge of water through orifices, notches, etc. Flow in pipes, and open channels. Sewerage, water-works, water-power, water-wheels, turbines, pumps, etc.

## THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

## Text-Books and Books of Reference.

- Baker—Masonry Construction (*d*).
- Billings—Heating and Ventilation.
- Bodmer—Hydraulic Motors, Turbines, etc., (*d*).
- Carnegie—Pocket Companion.
- Carpenter—Heating and Ventilation of Buildings (*c*).
- “ Experimental Engineering (*d*).
- Du Bois—Graphic Statics.
- “ Strains in Framed Structures.
- Gerhard—House Drainage and Sanitary Plumbing (*c*).
- Greene—Trusses and Arches.
- Innes—Centrifugal Pumps, Turbines and Water Motors (*d*).
- Johnson—Modern Framed Structures (*c*), (*d*).
- “ Materials of Construction (*d*).
- Kennedy—Mechanics of Machinery (*b*), (*c*).
- Kidder—Building Construction and Superintendence.
- “ Architect and Builders' Pocket Book.
- Lanza—Applied Mechanics.



Low and Bevis—Machine Drawing and Design (*b*), (*c*).

Low—Machine Drawing (*a*), (*b*), (*c*).

Merriman and Jacoby—Roofs and Bridges.

Merriman—Mechanics of Materials (*b*), (*c*), (*d*).

“       Hydraulics (*c*), (*d*).

Patton—Foundations (*d*).

Peabody—Thermodynamics (*d*).

“       Steam Tables (*d*).

Rafter and Baker—Sewage Disposal in the United States.

Rankine—Applied Mechanics (*c*), (*d*).

Reulcaux—The Constructor.

Santo Crimp—Sewage Disposal Works.

Shann—Elementary Treatise on Heat (*c*), (*d*).

Trautwine—Engineer's Pocket Book.

Unwin—Elements of Machine Design (*c*).

“       Testing of Materials of Construction.

Von Ott—Graphic Statics (*a*).

## THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel, wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

## Text-Books and Books of Reference.

Auchincloss—Valve and Link Motions (*c*).

Goodeve—Elements of Mechanism (*b*).

Halsey—Side Valve Gears.

Kennedy—Mechanics of Machinery (*b*), (*c*).

Rankine—Machinery and Millwork.

Reuleaux—Kinematics of Machinery.

## ELECTRICITY.

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises—

## ELEMENTARY ELECTRICITY AND MAGNETISM.

## MEASURING INSTRUMENTS—

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

## MATHEMATICAL THEORY OF ELECTRICITY.

## APPLICATIONS OF ELECTRICITY—

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

## THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.

## Text-Books and Books of Reference.

Bedell & Crehore—Alternating Currents.

Carhart & Patterson—Electrical Measurements (*b*), (*d*).

Bedell—Principles of the Transformer (*d*).

Fleming—Alternate Current Transformers, Vol. I. and II. (*d*).

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe—Electrical Testing (*b*).

Loudon & McLennan—Practical Physics (*b*).

Stewart & Gee—Practical Physics.

Thompson, S. P.—Elementary Electricity and Magnetism.

“ Dynamo Electric Machinery.

“ Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

## HISTORY OF ARCHITECTURE—

Egyptian, Assyrian and Persian.

Classic.

Romanesque and Byzantine.

Gothic.

Renaissance.

## ORDERS OF ARCHITECTURE.

## HISTORY OF ORNAMENT.

## PRINCIPLES OF DECORATION.

## Text-Books and Books of Reference.

Fergusson—History of Architecture.

Fletcher—A History of Architecture.

Gwilt—Encyclopædia of Architecture.

Leeds—Orders of Architecture (*b*).

Osborne—Art of House Planning (*d*).

Owen Jones—Grammar of Ornament.

Racinet—L'Ornement Polychrome.

Rickman—Gothic Architecture.

Sharpe—Seven Periods of Church Architecture.

Smith, T. Roger—Classic and Early Christian Architecture (*a*), (*b*).

“ Gothic and Renaissance (*c*).

Statham—Architecture for General Readers.

Sturgis—European Architecture.

Vignole—The Five Orders of Architecture (*b*), (*c*).

## MATHEMATICS AND PHYSICS.

The Pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

## Text-Books and Books of Reference.

Ganot—Physics (*b*).

Hall & Knight—Plane Trigonometry (*a*).

Loomis—Calculus (*b*).

Loudon & McLennan—Practical Physics (*b*).

Mackay—Elements of Euclid (*a*).

Newcomb & Holden—Astronomy (*b*).

Osborne—Calculus.

C. Smith—Conic Sections (*a*).

Hamblin Smith—Hydrostatics (*b*).

Balfour<sup>r</sup> Stewart—Heat.

Todhunter—Algebra (*a*).

“ “ Spherical Trigonometry (*b*)

Tyndall—Sound.

## CHEMISTRY.

## COURSES IN THE SCHOOL OF PRACTICAL SCIENCE—

Elementary chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

## COURSES IN THE UNIVERSITY OF TORONTO—

Inorganic chemistry.

Organic chemistry.

Chemical theory.

Physical chemistry.

## Text-Books and Books of Reference.

Allen—Commercial Organic Analysis.

Beilstein—Organic Chemistry.

Bloxam—Chemistry.

Bloxam & Blount—Chemistry for Engineers and Manufacturers.

- Blyth, A. W.—Poisons.  
Blyth, A. W.—Foods.  
Bolley—Handbuch der Chemischen Technologie.  
Douglas & Johnston—Qualitative Analysis.  
Fresenius—Qualitative and Quantitative Analysis.  
Jones—Practical Chemistry.  
Meyer—Modern Theories of Chemistry.  
“ —History of Chemistry.  
Miller & Smale—Qualitative Analysis.  
Miller, W. A.—Elements of Chemistry.  
Ostwald—Lehrbuch der Allgemeinen Chemie.  
Ostwald—Outlines of General Chemistry.  
Pattison Muir—Thermo-Chemistry, Elements of.  
Post—Chemisch-technische Analyse.  
Remsen—Inorganic Chemistry.  
Richter—Inorganic Chemistry.  
Roscoe & Schorlemmer—Treatise on Chemistry.  
Sadtlér—Organic and Applied Chemistry.  
Sutton—Volumetric Analysis.  
Thomson—History of Chemistry.  
Thorpe—Dictionary of Applied Chemistry.  
Van't Hoff—Chemistry in Space.  
Von Meyer & Jacobson—Lehrbuch der Organischen Chemie.  
Wagner—Chemical Technology.  
Watt—Dictionary of Chemistry.  
Winkler—Gas Analysis.  
Wurtz—History of Chemical Theory.  
“ Atomic Theory.

## MINERALOGY, GEOLOGY, MINING AND METALLURGY

### 1. Mineralogy and geology.

- Mineralogy and crystallography.
- Geology and palæontology.
- Petrography.
- Physical geography.

Blowpipe analysis.

Determinative mineralogy.

## 2. Mining and metallurgy.

Mining geology.

Ore dressing.

Metallurgy of iron and steel.

Metallurgy of nickel, copper, silver, etc.

Assaying.

Milling.

### Text-Books and Books of Reference.

Balling—Metallhuettenkunde.

Chapman or Brush—Mineral Tables.

Chapman—Mineralogy and Geology of Canada.

Dana—Manual of Geology.

Geikie—Text-Book of Geology.

Harker—Petrography.

Ihlseng—Manual of Mining.

Kemp—Handbook of Rocks.

Kemp—Ore Deposits of the United States.

Kuhnhardt—Ore Dressing.

Mitchell—Assaying by Crookes.

Nicholson—Palæontology.

Phillips—Ore Deposits.

Phillips and Bauerman—Elements of Metallurgy.

Plattner—Manual of Blowpipe Analysis.

Roberts-Austen—Metallurgy.

Rosenbusch—Petrography.

Schnabel—Allgemeine Huettenkunde.

## VACATION WORK.

### THESIS AND CONSTRUCTION WORK.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.



The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next following examination.

### CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Country and Suburban Roads.

“ THIRD YEAR.—The Disposal of City Wastes  
—Sewage, Garbage, etc.

#### Books of Reference.

Shaler—American Highways.

Rafter & Baker—Sewage Disposal in the United States.

### MINING ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

#### Books of Reference.

Kuhnhardt—Ore Dressing in Europe

Ihlseng—Manual of Mining.

### MECHANICAL AND ELECTRICAL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-shop Practice.

“ THIRD YEAR.—Foundry Practice.

#### Books of Reference.

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

## ARCHITECTURE.

For the second year the following set of freehand pencil sketches is required :

- I. Doorway from the object.
- II. Staircase                   “
- III. Fireplace with cross section.

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

“                   THIRD YEAR.—Twelve water-color studies.

## ANALYTICAL AND APPLIED CHEMISTRY.

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid and Alkali Manufacture.

“                   THIRD YEAR.—Coal Tar Products.

## Books of Reference.

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

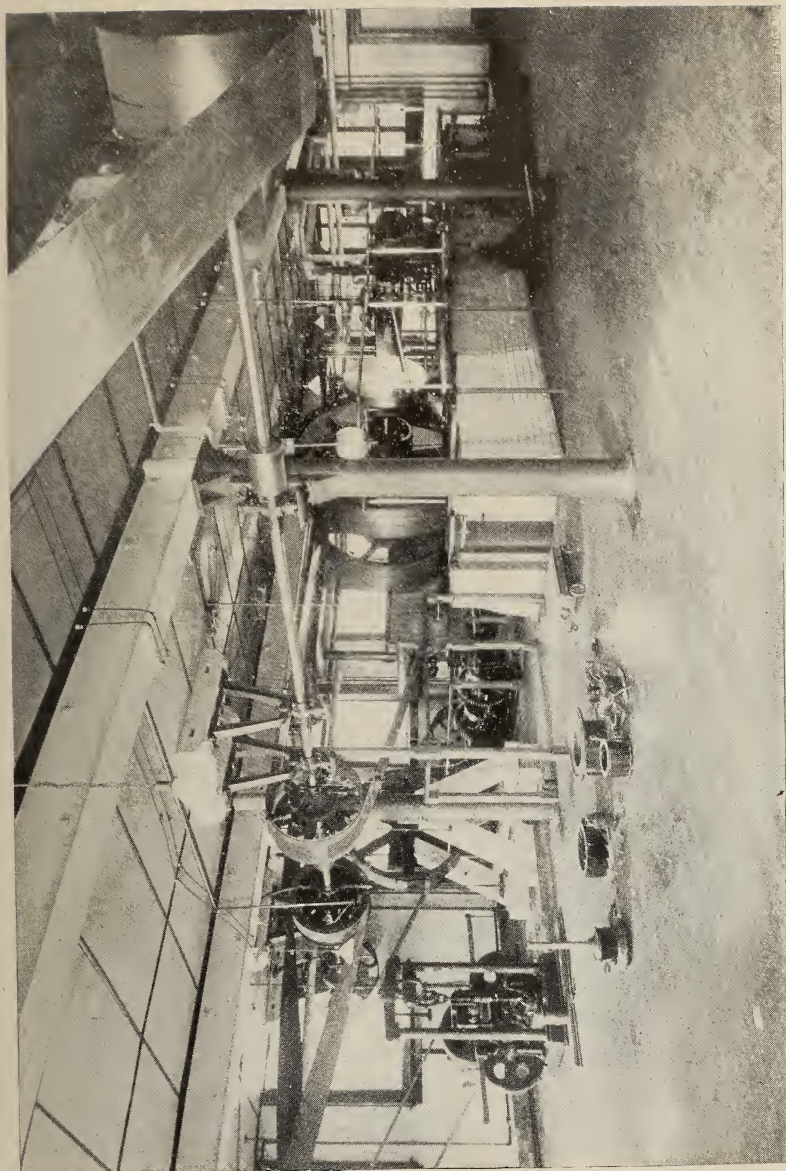
Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

## ENGINEERING LABORATORY.

This Laboratory occupies two floors, having a total area of 10,000 square feet. It consists of three departments, viz. :—

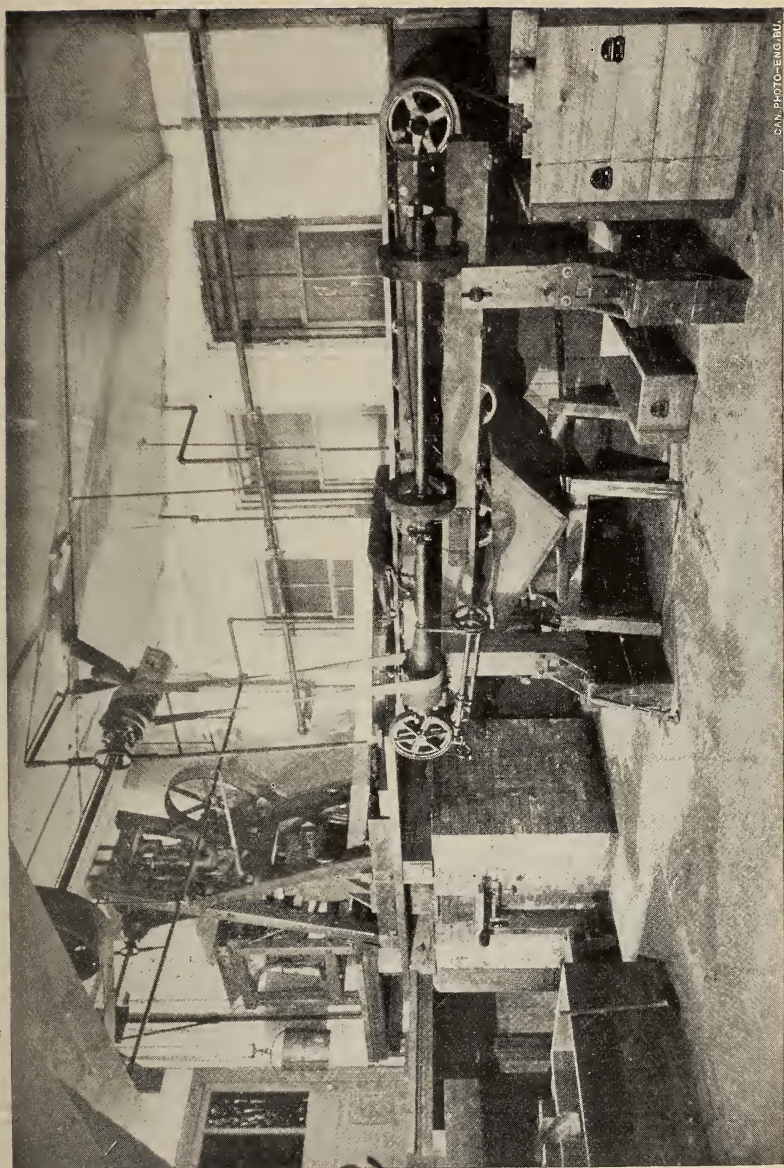
- (a) The department for testing materials of construction.
- (b) The department for investigating the principles governing the application of power. This department is sub-divided into the steam laboratory, the hydraulic laboratory and electrical laboratory.
- (c) The department for investigating problems connected with standards of length, time, astronomical observations, etc.



EXPERIMENTAL ENGINE.







SAU PHOTO-ENG. CO.

STAMP MILL.





In order to prepare specimens for the testing machines, a shop has been fitted up with a number of high-class machine tools specially suited for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs.

The machines in the department for testing materials are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 20,000-pounds Universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity. This machine will take specimens up to forty-eight inches in length.

A Riehle 2,000, and a Riehle 600 pounds cement testing machine. The cement testing-room is fitted with all the usual accessories.

The equipment of the power department is as follows :

A Babcock and Wilcox 52-h.p. boiler.

A Harrison-Wharton 12-h.p. boiler.

A 50-H.P. Brown engine. This engine was constructed specially for experimental investigation. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser, kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers.

A machine for testing lubricating oils and measuring journal friction, built by Riehle Bros. of Philadelphia.

The hydraulic division of the laboratory is furnished with a three-throw pump with double acting cylinders. It has a capacity of 500,000 gallons per 24 hours. There are also large tanks furnished

with orifices and weirs, measuring tanks, etc. A three foot jet turbine, a nine-inch McCormick, and a six-inch New American turbine, the latter the gift of the firm of William Kennedy & Sons, Owen Sound, form a part of the same equipment.

The power department is equipped with the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers.

The shafting is driven by a 7-h.p. Otto gas engine, a 20 kw. Edison motor, and the Brown engine above described.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length ; a 10-foot Rogers comparator with a graduating attachment ; a Kater's pendulum ; a Howard astronomical clock and electro-chronograph ; a Troughton & Simms 10-inch theodolite, and all the ordinary surveying instruments.

### ELECTRICAL LABORATORY.

The first section of this laboratory is the engineering division, in which a 20 kilowatt motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, an alternator, and the rotary transformer when used as polyphase dynamo. There are direct current motors of 6 H. P. and 3 H.P., (Edison and Crocker Wheeler), a rotary converter which may be run as a motor from the continuous current circuit and supply either three phase or two phase alternating currents, a three phase induction motor, and smaller motors, of which one is for alternating current.

On the walls, besides rheostats, are four types of transformers, Westinghouse, Stanley, Wagner and Thomson-Houston, and recording meters for continuous and alternating currents. Arc lamps of eight types, are hung around the laboratories, including the Manhattan incandescent arc lamp, Ward, Universal, Thomson-Houston, Ball, an alternating current arc, and the Turbayne, the latter a gift from Mr. W. A. Turbayne.

There are two sets of "Chloride" accumulators available for testing purposes.

A new switchboard has recently been constructed which affords every facility for interconnection of circuits and carries measuring instruments which may be readily introduced into any circuit.

A Thomson balance, a multicellular electrostatic voltmeter, and an high potential electrostatic voltmeter, a Siemen's electrodynamometer, and standard Weston voltmeters, ammeters and wattmeters furnish the means either of accurate observation or for standardizing of instruments for ordinary use. These are generally used in a separate room to which connection is made.

The second section of the electrical laboratory is a room 24 by 49 ft., in another part of the basement, from which iron has as far as possible been removed. Here ten masonry piers support galvanometers, an electrometer, and other mirror reflecting instruments, and testing work can be done free from disturbing influences.

Fume cupboards and sinks have been provided for work with galvanic and storage cells ; the room is also supplied with Wheatstone bridges, Kohlrausch apparatus for electrolytes, standard divided microfarad condenser, Clark cells and other apparatus. Wires lead from this room to the switchboard allow measurements to be made here in connection with experiments in the other laboratory.

Connections to the 110-volt circuit of the city are accessible in all the rooms.

### THE CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratory will accommodate about twenty students. They are furnished with convenient work tables and fume cupboards, and are supplied with the most recent apparatus for gravimetric, volumetric and gasometric analysis, both scientific and technical.

The apparatus includes a number of excellent balances by the best makers, furnaces for fusion, etc., and for organic combustions for experimental vacuum, pan, and filler press.

A very complete set of apparatus for technical gas analysis ; all requisites of the assay of ores and furnace products in the wet way ; the latest forms of Fischer's and Mahler's apparatus for the determination of the heating power of fuel ; facilities for the electrolytic determination of metals, including a Gölcher's thermoelectric pile, spectroscopes, polariscopes, microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

### BLOWPIPE LABORATORY.

This laboratory will accommodate a class of thirty-six students, and is supplied with all the equipment required for qualitative and quantitative blowpipe work.

### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two gas roasting furnaces, three charcoal crucible furnaces, and one charcoal cupel furnace, a Taylor hand crusher, Blake laboratory crusher, a muller and all other necessary appliances for pulverizing and preparing ores for fire assay. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope ; also the necessary appliances for making rock sections by hand. Four petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silvered copper plates, and a Frue Vanner. The concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse-power Edison motor, which is supplied with current from the city circuit. The mill

room is also provided with settling tanks for the tailings and concentrates.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a reverberatory furnace for roasting sulphide and arsenical ores; leaching vats for treating ores by the cyanide process and a chlorination plant.

This completes the equipment for treating gold ores, and makes it possible to extract the gold from the concentrates saved by the Frue Vanner.

### PHYSICAL LABORATORY.

#### University of Toronto.

The Physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines (Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

### MODERN LANGUAGES.

No special examinations are held in these languages except in the Fourth Year, but it is expected that every student in a regular course should be able to acquaint himself with the contents of any of the works necessary to his profession, written in these languages. Such books may be prescribed for the terminal examinations.



## LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference on the subjects of study pursued in the School has been formed and is being added to year by year.

## MUSEUMS

The Geological Museum, includes collections of minerals, rocks and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes ; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

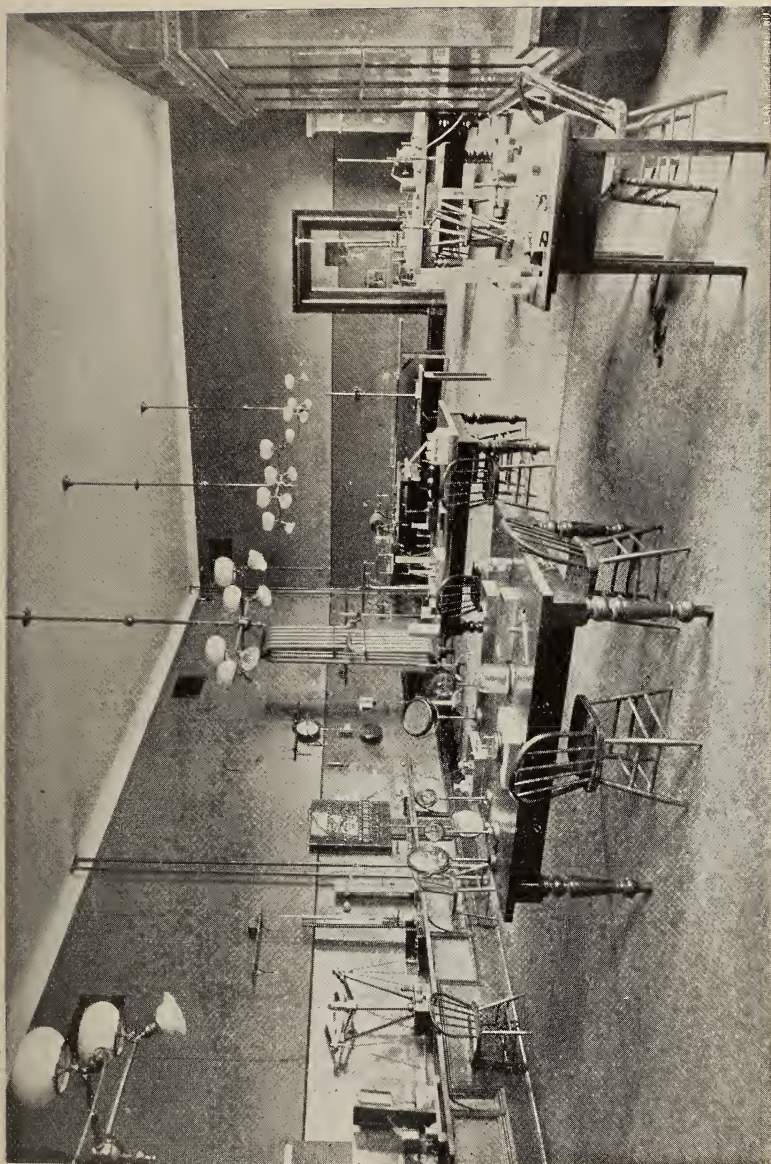
The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive, schistose and sedimentary rocks ; the other a set of Canadian rocks, specially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The paleontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.





ELEMENTARY PHYSICAL LABORATORY (University of Toronto).





ARCHITECTURAL LECTURE ROOM.





## EXCURSIONS.

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years. These excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

## THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

## Officers for 1897-8.

<i>President</i> .....	H. S. CARPENTER.
<i>Vice-President</i> .....	F. C. SMALLPIECE.
<i>Recording Secretary</i> .....	E. V. NEELANDS.
<i>Treasurer</i> .....	ALEX. H. SMITH.
<i>Corresponding Secretary</i> .....	R. D. WILLSON.
<i>Editor</i> .....	A. T. LAING, B.A. SC.
<i>Librarian</i> .....	T. A. WILKINSON.
<i>Assistant Librarian</i> .....	W. W. VANEVERY.
<i>Graduates Representative</i> .....	W. W. STULL.
<i>Fourth Year</i> do .....	A. T. GRAY.
<i>Third Year</i> do .....	W. H. BOYD.
<i>Second Year</i> do .....	T. SHANKS.
<i>First Year</i> do .....	F. W. THOROLD.

## Officers for 1898-9.

<i>President</i> .....	J. A. STEWART.
<i>Vice-President</i> .....	C. D. COLLINS.
<i>Recording Secretary</i> .....	F. W. THOROLD.
<i>Treasurer</i> .....	G. POWER.
<i>Corresponding Secretary</i> .....	R. LATHAM.
<i>Editor</i> .....	
<i>Librarian</i> .....	W. W. VANEVERY.
<i>Assistant Librarian</i> .....	G. HUNT.
<i>Graduates Representative</i> .....	W. H. BOYD.
<i>Fourth Year</i> do .....	R. SMITH.
<i>Third Year</i> do .....	G. HALL.
<i>Second Year</i> do .....	H. S. HOLCROFT.
<i>First Year</i> do .....	(To be appointed in Oct.)

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society subscribes for the leading engineering journals for the use of the students, and publishes a pamphlet annually, containing the best papers read before the Society.

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SESSION 1897-8.

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STUDENTS IN ATTENDANCE.

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FIRST YEAR.

Regular Students.

1. Adams, F. P ..... Brantford.
2. Ardagh, E. G. R ..... Toronto.
3. Batt, T. W ..... West Toronto June
3. Bell, J. W ..... St. George.
2. Boswell, M. C ..... Peterboro'.
3. Carmichael, C. G ..... Markham.
3. Clark, J ..... St. Helens.
3. Davidson, W. S ..... Peterboro'.
1. Davison, J. E ..... Toronto.
3. Dickson, G ..... Toronto.
2. Dixon, H. A ..... Eglington.
2. Fullerton, C. H ..... Atwood.
2. Gray, J. W ..... Toronto.
3. Gregory, H. G ..... Lindsay.
3. Guest, W S ..... Elginfield.
3. Henry, J. A ..... St. Ives.
2. Hunt, G. A ..... Galetta.
3. Johnston, H. A ..... Toronto.
2. Johnston, J. A ..... Pepperlaw.
3. Larkworthy, W. J ..... Mitchell.
3. Lavell, M. N ..... Toronto.



2. McKenzie, J. R .....Toronto.
2. McMillan, J. G .....Dutton.
2. Matheson, W. C .....Milton.
3. Middleton, H. T .....Toronto.
3. Miller, L. H.....Aylmer, Ont.
1. Morley, R. W .....Waterloo.
1. Phillips, E. H .....Tilsonburg.
3. Price, H. W.....Brampton.
2. Roaf, J. R.....Toronto.
3. Roy, J. E .....Listowel.
2. Saunders, H. W .....Petrolea.
1. Seath, J.....Toronto.
2. Swannell, F. C.....Toronto.
1. Tennant, W. C.....Toronto.
1. Thorold, F. W.....Toronto.
1. Wales, E. A .....Toronto.
1. Weir, H. M .....Brantford.

#### Non-Regular Students Taking Full Courses.

3. Beatty, F. R .....Toronto.
3. Bickerton, G. W .....Duquesne, Pa., U.S.
2. Burd, J. H .....Parry Sound.
2. Cameron, A. J .....Peterboro'.
3. Clark, N .....Toronto.
1. Clarke, F. F.....Deer Park.
1. Cooper, C. E.....Toronto.
3. Dickenson, E. D .....Barrie.
1. Duncan, G .....Drayton.
2. Edgar, D. K.....Toronto.
3. Evans, W. F .....Toronto.
1. Fuller, W. J.....Leamington.
2. Gooderham, G. E .....Toronto.
2. Gulik, J. H .....Ayr.
3. Hamilton, T. E .....Fergus.
4. Hare, F. C .....Whitby.
2. Henry, J. S .....Toronto.

2. Holcroft, H. S. .... Toronto.
1. Hore, F. W. .... Hamilton.
4. Hoy, J. A. .... Orillia.
3. Hunt, C. R. .... London.
3. Johnston, J. C. .... Toronto.
3. Lumbers, W. C. .... Toronto.
3. Lytle, C. W. .... Toronto.
1. Macdonald, W. R. .... Toronto.
3. Mace, F. G. .... Toronto.
4. Moffatt, N. .... Renfrew.
2. Morrison, J. A. .... Winthrop.
1. Power, G. H. .... Toronto.
2. Smith, A. H. .... Toronto.
3. Spencer, J. G. .... Brantford.
2. Thorne, S. M. .... Toronto.
5. White, E. H. .... Toronto.
3. Withrow, F. D. .... Toronto.

## SECOND YEAR.

1. Allan, J. L. .... Halifax, N.S.
3. Barber, T. .... Meaford.
3. Barley, J. H. .... Mitchell.
1. Bray, L. T. .... Amherstburg.
3. Burns, T. L., deceased.
2. Burnside, T. .... Deer Park.
3. Chubbuck, L. B. .... Ottawa.
3. Clendenning, W. J. .... Walkerton.
2. Clothier, G. A. .... Kemptville.
3. Collins, C. D. .... Peterboro'.
1. Cooper, C. .... Hampden.
2. Coulthard, R. W. .... Toronto.
3. Craig, J. A. .... Port Hope.
2. Elliott, J. C. .... Kelso.
1. Finch, H. J. W. .... Toronto.
3. Foreman, W. E. .... Toronto.
3. Gordon, C. B. .... Strathroy.

3. Guy, E ..... Columbus.
3. Hall, G. A ..... Washington.
3. Hare, W. A ..... Dartmouth, N.S.
3. Hemphill, W ..... Toronto.
1. Latham, R ..... Eglington.
3. Little, J. F ..... Waterford.
2. McArthur, R. E ..... Toronto.
3. McMichael, C. M ..... Toronto.
3. Monds, W ..... Caledon East.
2. Neelands, E. V ..... Lindsay.
1. Patterson, J ..... Thamesford.
3. Pope, A. S. H ..... Toronto.
2. Revell, G. E ..... Woodstock.
3. Rounthwaite, C. H. E ..... Collingwood.
3. Saunders, G. A ..... Petrolea.
1. Shanks, T ..... Moose Creek.
1. Tennant, D. C ..... Toronto.
3. VanEvery, W. W ..... Peterboro'.
3. Wagner, W. E ..... Toronto.
2. Watt, G. H ..... Walkerton.
1. Willson, R. D ..... Toronto.
3. Yeates, E ..... London.

## THIRD YEAR.

2. Boyd, W. H ..... Toronto.
2. Carter, W. E. H ..... Toronto.
3. Darling, E. H ..... Simcoe.
1. Grant, W. F ..... Toronto.
1. Kormann, J. S ..... Toronto.
3. Lavrock, J. E ..... Hamilton.
4. Mackintosh, D ..... Halifax, N.S.
1. McNaughton, F. D ..... Cornwall.
1. Perry, F. M ..... Toronto.
1. Shaw, J. H ..... Beachburg.
3. Shipley, A. E ..... Cheltenham.
3. Smallpiece, F. C ..... Toronto.

*STUDENTS IN ATTENDANCE.*

1. Smith, R. W.....New Hamburg.
1. Stewart, J. A .....Renfrew.
1. Vercoe, H. L.....Toronto.
3. Wilkinson, T. A.....Copetown.
3. Williamson, D. A.....Jarvis.

**FOURTH YEAR.**

- Carpenter, H. S.....Collingwood.  
 Charlton, H. W .....Hanover.  
 Gray, A. T .....Toronto.  
 Robinson, A. H.....Peterboro'.  
 Smiley, R. W .....Kippen.  
 Stull, W. W .....Georgetown.  
 Weekes, M. B .....Brantford.

**OCCASIONAL STUDENTS.**

- Beardmore, W. W .....Toronto.  
 Bickford, O. L.....Toronto.  
 Boulton, H .....Toronto.  
 Brockunier, S. H.....Wheeling, W. Va., U.S.  
 Dalby, C. W.....Toronto.  
 McArthur, P. C .....Toronto.  
 Macmillan, A. N .....Oshawa.  
 Nourse, C. G. K .....Toronto.  
 Piper, A. G .....Toronto.  
 Royce, J. C .....Toronto.  
 Smith, L. W.....Toronto.

**PROSPECTORS' CLASS.**

- Anderson, A.....Sutton, W.  
 Bettes, J. W.....Bracebridge.  
 Clarke, S. R.....Toronto.  
 Dickenson, J.....North Bay.  
 Dickenson, T .....North Bay.  
 Elliott, P. P.....Mine Centre.

Galbraith, W .....	Bracebridge.
Gordon, C. L. W.....	Toronto.
Grimstone, S. G.....	———.
Jones, T. H .....	Toronto.
Silvester, F. W .....	Ringwood.
Stewart, W. F .....	Toronto.
Sweny, R .....	Toronto.
Vankoughnet, E .....	Toronto.
Warren, J. S .....	Toronto.

## PRIZEMEN.

## Engineering.

1879.—	I.	Year .....	J. McAREE.....	1st prize.
1880.—	II.	Year .....	J. L. MORRIS.....	1st prize.
1881.—	I.	Year .....	G. H. DUGGAN.....	1st prize.
	II.	Year .....	D. JEFFREY .....	1st prize.
1882.—	I.	Year .....	A. R. RAYMER .....	1st prize.
	I.	Year .....	E. W. STERN .....	2nd prize.
	II.	Year .....	G. H. DUGGAN.....	1st prize.
	III.	Year .....	D. JEFFREY .....	1st prize.
1883.—	I.	Year .....	B. A. LUDGATE .....	1st prize.
	I.	Year .....	A. M. BOWMAN .....	2nd prize.
	II.	Year .....	A. R. RAYMER.....	1st prize.
	II.	Year .....	E. W. STERN .....	2nd prize.
	III.	Year .....	G. H. DUGGAN.....	1st prize.
1884.—	II.	Year .....	B. A. LUDGATE .....	1st prize.
	III.	Year .....	E. W. STERN .....	1st prize.
	III.	Year .....	A. R. RAYMER.....	2nd prize.
1885.—	I.	Year .....	A. F. LOTT .....	1st prize.
	I.	Year .....	J. ROGER .....	2nd prize.
	II.	Year .....	T. K. THOMSON .....	1st prize.
	III.	Year .....	B. A. LUDGATE .....	1st prize.

- 1886.— I. Year ..... C. H. C. WRIGHT ..... 1st prize.  
           I. Year ..... J. E. ROSS ..... 2nd prize.  
           II. Year ..... A. E. LOTT ..... 1st prize.
- 1887.— I. Year ..... H. E. T. HAULTAIN ..... 1st prize.  
           II. Year ..... C. H. C. WRIGHT ..... 1st prize.  
           III. Year ..... A. E. LOTT ..... 1st prize.  
           III. Year ..... J. ROGER ..... 2nd prize.
- 1888.— I. Year ..... E. B. MERRILL ..... 1st prize.  
           I. Year ..... F. M. BOWMAN ..... 2nd prize.  
           II. Year ..... D. D. JAMES ..... 1st prize.  
           III. Year ..... C. H. C. WRIGHT ..... 1st prize.
- 1889.— I. Year ..... J. K. ROBINSON ..... 1st prize.  
           I. Year ..... G. E. SILVESTER ..... 2nd prize.  
           II. Year ..... E. B. MERRILL ..... 1st prize.  
           II. Year ..... F. M. BOWMAN ..... 2nd prize.  
           III. Year ..... D. D. JAMES ..... 1st prize.
- 1890.— I. Year ..... C. FAIRCHILD ..... 1st prize.  
           II. Year ..... J. K. ROBINSON ..... 1st prize.  
           III. Year ..... F. M. BOWMAN ..... 1st prize.  
           III. Year ..... E. B. MERRILL ..... 2nd prize.
- 1891.— I. Year ..... A. J. MCPHERSON ..... 1st prize.  
           I. Year ..... R. B. WATSON ..... 2nd prize.  
           II. Year ..... J. B. GOODWIN ..... 1st prize.  
           III. Year ..... G. E. SILVESTER ..... 1st prize.  
           III. Year ..... C. W. DILL ..... 2nd prize.
- 1892.— I. Year ..... A. E. BERGEY ..... 1st prize.  
           I. Year ..... R. W. ANGUS ..... 2nd prize.  
           II. Year ..... A. J. MCPHERSON ..... 1st prize.  
           II. Year ..... R. B. WATSON ..... 2nd prize.  
           III. Year ..... E. J. LASCHINGER ..... 1st prize.  
           III. Year ..... C. FAIRCHILD ..... 2nd prize.

The grant for prizes was withdrawn at the close of 1892.



**Architecture.**

The prize in Architecture is the gift of Mr. D. B. Dick, Architect, Toronto

- 1891.— I. Year .....H. BALLANTYNE.  
 1892.— I. Year .....J. A. EWART.  
 1893.— I. Year .....A. HARKNESS.  
 1894.— I. Year .....E. A. FORWARD.  
 1895.— I. Year .....W. F. SCOTT.  
 1896.— I. Year .....D. MACKINTOSH.

**Civil Engineering.**

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C.E., New York.

- 1897.—III. Year .....M. B. WEEKES.

**Mechanical and Electrical Engineering.**

The prize in Mechanical and Electrical Engineering is the gift of Mr. F. A. Richle, Philadelphia.

- 1897.—III. Year .....A. T. GRAY.

## GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

Year.	Dept.	Name.	Address.
1892..	1	Alison, T. H., B.A. Sc., Draftsman .....	Augustus Smith & Co., 39, 41 Courtland St., New York.
1892..	1	Allan, J. R., O.L.S.....	Renfrew, Ont.
1892..	1	Anderson, A. G .....	Port Dover, Ont.
1897..	2	Andrewes, E.....	Crow's Nest Pass Ky., Lethbridge, B.C.
1894..	2	Angus, R. W., B.A.Sc., Fellow in Elec- trical Engineering .....	School of Practical Science, Toronto.
1888.	1	Apsey, J. F., O.L.S., Resident Engineer Baltimore Belt R.R.....	2125 N. Congress St., Baltimore, Md.
1893..	1	Ardagh, J. A., Town Engineer.....	Barrie, Ont.
1895..	1	Armstrong, J., B.A.Sc., Hydraulic Engi- neer .....	Kakabeka Power Co., Port Arthur.
1888..	1	Ashbridge, W. T .....	City Engineer's Office, London, Ont.
1896..	2	Bain, J. W., B.A.Sc., Fellow in Mining Engineering .....	School of Practical Science, Toronto.
1888..	1	Ball, E. F., A.M. Can. Soc. C.E., Sur- veyor and Consulting Engineer.....	Dawson, N.W.T.
1893	4	Ballantyne, H. F., B.A.Sc.....	Cady, Berg & See, New York.
1894..	1	Barker, H. F.....	Orillia, Ont.
1891..	1	Beatty, H. J., O.L.S ...	Pembroke, Ont.
1894..	3	Beauregard, A. T., B.A.Sc.....	New England Engi- neering Company, Waterbury, Mass.
1894..	1	Bergey, A. E .....	Riter & Conley, Alle- ghany, Pa.
1895..	3	Blackwood, A. E.....	Sullivan Machine Co., Claremont, N.H.
1885..	1	Bleakley, F. W.....	Room 46, Sullivan Block, Seattle, W.T.
1895..	1	Boswell, E. J., O.L.S., Assistant Engineer	Crow's Nest Pass, Ry., Lethbridge, B.C.
1890..	5	Boustead, W. E., B.A.Sc., deceased.	

GRADUATES.—*Continued*

Year.	Dept.	Name.	Address.
1897..	2	Bow, J. A., Inspector of Mines for Western Ontario .....	Rat Portage, Ont.
1886..	1	Bowman, A. M., D. & O.L.S., Assistant Engineer Ohio River Improvement ....	Merrill, Pa.
1890..	1	Bowman, F. M., C.E., O.L.S., Chief Engineer .....	Riter & Conley, Alleghany, Pa.
1885..	1	Bowman, H. J., D. & O.L.S., A.M. Can. Soc. C E., Town Engineer ....	Berlin, Ont.
1894..	3	Boyd, D. G., Inspector of Mines .....	Michipicoten, Ont.
1895..	3	Brebner, G... ..	General Electric Co., Schenectady, N.Y.
1895..	3	Brodie, W. M., B.A.Sc., Draftsman.....	Pendrith & Co., Toronto, Ont.
1888..	1	Brown, D. B., O.L.S., Mexican Southern Ry.....	Old Mexico.
1893..	1	Brown, G. L., O.L.S., Town Engineer...	Morrisburg, Ont.
1895..	3	Brown, L. L., Locomotive Dept.....	N. Y., N. H. & H. Ry., New Haven, Conn.
1890..	1	Bucke, M. A., M.E., Mining Engineer	Trethewey & Bucke, Kaslo, B.C.
1894..	3	Bucke, W. A., B.A.Sc.....	Royal Electric Co., Montreal, P.Q.
1883..	1	Burns, D., O.L.S., A.M. Can. Soc. C E.	Keystone Bridge Co., Pittsburgh, Pa.
1887..	1	Burns, J. C., deceased.	
1896..	2	Burwash, L. T., Mining Engineer ...	N. A. T. & T. Co., Dawson, N.W.T.
1896..	3	Campbell, G. M.....	Canadian Pacific Railway, Montreal.
1895..	4	Campbell, R. G .....	St. Catharines, Ont.
1888..	1	Canniff, C. M .....	City Surveyor's Office, Toronto, Ont.
1889..	1	Carey, B .....	Engineer's Office, Toronto.
1897..	1	Carpenter, H. S., (Post graduate course).	School of Practical Science, Toronto.
1894..	1	Chalmers J., O.L.S. ....	Rat Portage, Ont.
1889..	1	Chalmers, W. J .....	Cayuga, Ont,
1893..	1	Charlesworth, L. C., O.L.S. ....	Stewart & Charlesworth, Collingwood and Rat Portage.

GRADUATES.—*Continued.*

YEAR.	DEPT.	NAME.	ADDRESS.
1888..	1	Chewett, H. J., B.A.Sc., A.M. Can. Soc. C.E., Civil and Mining Engineer.	83½ York St., Toronto.
1889..	1	Clement, W. A. ....	City Engineer's Office, Toronto, Ont.
1895..	3	Connor, A. W., B.A. ....	Hamilton Bridge Co., Hamilton, Ont.
1890..	1	Corrigan, G. D., deceased.	
1891..	1	Deacon, T. R., O.L.S., Town Engineer.	Rat Portage, Ont.
1896..	2	De Cew, J. A. ....	Arrowhead Saw Mills & Planing Co., Arrowhead, B.C.
1891..	1	Dill, C. W., Superintendent .....	Clifton, Suspension Bridge, Niagara Falls, N.Y.
1895..	1	Dobie J. S., B.A. Sc., O.L.S., Mining Engineer .....	Port Arthur.
1890..	1	Duff, J. A., B.A., A. M. Can. Soc. C.E., Lecturer in Applied Mechanics.....	School of Practical Science, Toronto.
1883..	1	Duggan, G. H., M. Can. Soc. C.E., Chief Engineer .....	Dominion Bridge Co., Montreal, P.Q.
1893..	1	Dunn, T. H. ....	Arkona, Ont.
1896..	3	Elliott, H. P., B.A.Sc. ....	Technical School, Toronto, Ont.
1890..	1	English, A. B. ....	106 Gould St., Toronto.
1894..	4	Ewart, J. A., B.A.Sc., Architect.....	Arnoldi & Ewart, Architects, Ottawa, Ont.
1893..	1	Fairbairn, J. M. R. ....	Kaslo, B.C.
1892..	1	Fairchild, C., O.L.S. ....	Simcoe, Ont.
1893..	4	Fingland, W., Architect.....	307 W. 119th St., New York.
1893..	1	Forester, C. ....	Gormley, Ont.
1897..	4	Forward, E. A. ....	Iroquois, Ont.
1893..	1	Francis, W. J., A. M. Can. Soc. C.E., Staff of Trent Canal .....	P. O. Box 228, Peterboro', Ont.
1890..	1	Garland, N. L. ....	Eglington, Ont.
1888..	1	Gibbons, J., D. & O.L.S. ....	Alaska Boundary Survey, Department of the Interior, Ottawa, Ont.

GRADUATES.—*Continued.*

YEAR.	DEPT.	NAME.	ADDRESS.
1893..	3	Goldie, A. R., Assistant Manager.....	Goldie & McCulloch Co., Ltd., Galt, Ont.
1892..	1	Goodwin, J. B., B.A. Sc . . . . .	Town Engineer's Office, Niagara Falls, Ont.
1897..	3	Gray, A. T., (Post-graduate course) . . . . .	School of Practical Science, Toronto.
1895..	1	Guernsey, F. W., Engineer . . . . .	Neepawa Gold Mining Co., Wabigoon.
1896..	3	Gurney, W. C. . . . .	Gurney Foundry Co., Toronto, Ont.
1896..	3	Haight, H. V., B.A.Sc. . . . .	Canadian Rand Drill Co., Halifax, N. S.
1893..	3	Hanly S. C. . . . .	A. R. Williams, Machinery Co., Ltd., Toronto.
1889..	1	Hanning, G. F. . . . .	Toronto Railway Co., Toronto, Ont.
1895..	4	Harkness, A. H., B.A.Sc . . . . .	T. H. Wiggins, Cornwall, Ont.
1889..	1	Haultain, H. E. T., Mining Engineer...	Kaslo, B. C.
1885..	1	Henderson, E. E., O.L.S. . . . .	Henderson P.O., Piscataquis, Me.
1894	3	Herald, W. J., B.A. Sc, Mechanical Engineer . . . . .	Noble Three Mining Co., Rossland, B. C.
1886..	1	Herman, E. B., D. & O.L.S. . . . .	Gordon, Hermon & Burwell, Vancouver, B. C.
1897..	3	Hicks, W. A. B. . . . .	Northey Mfg. Co., Toronto, Ont.
1895..	3	Hull, H. S., B.A. Sc., Draftsman . . . . .	Stilwell-Bierce & Smith Vale Pump Co., Dayton, O.
1890..	1	Hutcheon, J., O.L.S., City Engineer . . . .	Guelph, Ont.
1890..	1	Innes, W. L., O.L.S., C.E . . . . .	Ranney & Innes, Civil Engineers and Surveyors, Peterboro', Ont.
1883..	1	Irvine, J . . . . .	Harriston, Ont.
1889..	1	James, D. D., B.A., B.A. Sc., O.L.S....	77 Victoria St., Toronto.
1891.	5	James, O. S., B.A.Sc., Analytical Chemist.	192 Jarvis St., Toronto.
1882..	1	Jeffrey, D. . . . .	Contractor, Stratford, Ont.
1894..	3	Job, R. E., B.A.Sc., Manager . . . . .	Kay Electric Co., Hamilton, Ont.

GRADUATES.—*Continued.*

YEAR.	DEPT.	NAME	ADDRESS.
1894..	1	Johnson, S. M., B.A.Sc., O.L.S., Engineer	Johnson & McAllister, Trail, B. C.
1894..	3	Johnston, A. C., B.A.Sc., Draftsman....	McMyler & Co., Cleve- land, O.
1894..	1	Jones, J. E., Draftsman .....	Carnegie Steel Co., Pittsburg, Pa.
1893..	4	Keele, J., B.A.Sc., Acting Demonstrator in Civil Engineering .....	School of Practical Science, Toronto.
1882..	1	Kennedy, J. H., C.E., O.L.S., Architect etc .....	St. Thomas, Ont.
1897..	4	King, C. F.....	Warren Chemical & Manufacturing Co., Detroit, Mich.
1884..	1	Kirkland, W. C .....	Illinois Central Ry., New Orleans, La.
1893..	1	Laidlaw, J. T., B. A. Sc., Consulting Mining Engineer .....	Fort Steele, B. C.
1892..	1	Laing, A. T., B.A.Sc., Acting Demon- strator in Surveying .....	School of Practical Science, Toronto.
1896..	1	Laing, W. F.....	Deacon & Switzer, Rat Portage.
1886..	1	Laird, R., O.L.S .....	Reduction Works, Rat Portage.
1891..	1	Lane, A., O.L.S., Chief Draftsman....	Structural Department Maryland Steel Co., Sparrows' Point, Md.
1892..	4	Langley, C. E., Architect .....	Langley & Langley, Architects, Toronto.
1892..	1	Laschinger, E.J., B.A.Sc., Chief Drafts- man.....	Consolidated Gold Fields of South Africa, Johannes- burg, South African Republic.
1893..	3	Lash, F. L., Chief Engineer.....	Sugar Factory, Boed- oeran, Java.
1894..	3	Lash, N.M .....	Bell Telephone Co., Toronto, Ont.
1896..	3	Lawrie, R. R .....	Bowmanville, Ont.
1892..	5	Lawson, W., B.A.Sc.....	Rat Portage, Ont.
1892..	3	Lea, W. A., B.A.Sc., Mechanical Engineer	Mexican & South East- ern Railway Co., San Geronimo, Mexico.
1887..	1	Lott, A. E., Railway Construction .....	San Antonio de la Huerta, Mexico.
1885..	1	Ludgate, B. A., O.L.S.....	Texas Midland Ry., Terrell Texas.



GRADUATES.—*Continued.*

Year.	Dept	Name.	Address.
1893..	1	McAllister, A. L., B.A.Sc., Draftsman ..	New Jersey Steel and Iron Co., Trenton, N. J.
1891..	1	McAllister, J. E., B.A.Sc. Engineer. ....	Johnston & McAllister, Trail, B. C.
1893..	1	Macallum, A. F., B.A.Sc.....	Technical School, Toronto, Ont.
1882..	1	McAree, J., B.A.Sc., D.T.S., O.L.S., Mining Engineer and Surveyor.....	Dominion Gold Mining and Reduction Co., Limited, Rat Portage, Ont.
1896..	3	Macbeth, C., B.A. Sc.....	Toronto, Ont.
1887..	1	McCullough, A. L., O.L.S., A.M. Can. Soc. C.E. ....	Civil and Hydraulic Eng., Petrolea, Ont.
1888..	1	McDowall, R., O.L.S., A.M. Can. Soc. C.E., Town Engineer. ....	Owen Sound, Ont.
1884..	1	McDougall, J., B.A., County Engineer.	Court House, Toronto.
1892..	1	McEntee, B., B.A. Sc., Assistant .....	J. McAree, Rat Portage, Ont.
1888..	1	McFarlane, G. W., O.L.S., Assistant County Engineer. ....	Court House, Toronto.
1893..	1	McFarlen, T. J.....	
1895..	3	McGowan, J., B.A., B.A. Sc., Draftsman	Brown-Ketcham Iron Works, Indianapolis, Pa.
1885..	1	McKay, O., O.L.S., Railway Engineer ..	Windsor, Ont.
1895..	3	McKay, W. N. ....	100 Madison ave., Toronto, Ont.
1895..	3	McKinnon, H. L., B.A.Sc .....	Hughes Steam Pump Co., Cleveland, O.
1896..	3	MacMurchy, J. A .....	Westinghouse Machine Co., Wilkinsburg, Pa.
1893..	1	McPherson, A. J., B.A.Sc., O.L.S., Town Engineer. ....	Galt, Ont.
1894..	1	McTaggart, A. L., B.A.Sc.....	Bridge Dept., Carnegie Steel Co., Pittsburg, Pa.
1893..	1	Main, W. T.....	Brampton, Ont.
1888..	1	Marani, C. J., General Agent .....	Canada Permanent Loan Co., Vancouver B.C.
1893..	1	Marani, V. G., Assistant Engineer .....	Cleveland Gas, Light & Coke Co., 356 Superior st., Cleveland, O.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1887..	1	Martin, F., O.L.S., M.D.....	Hospital for Sick Children, Toronto, Ont.
1896..	1	Martin, T., B.A.Sc., Amalgamator. ....	Regina Mine.
1895..	1	Meadows, W. W., O.L.S.....	Rat Portage.
1890 {	1	} Merrill, E. B., B.A., B.A.Sc.....	Siemens Bros. & Co., Woolwich, Eng.
&	2		
3	3		
1888..	1	Mickle, G. R., B.A., Mining Engineer, Lecturer in Mining .....	School of Practical Science, Toronto.
1889..	1	Mill, F. X. ....	268 Main St. E., Pitts- burg, Pa.
1892..	3	Milne, C. G., B.A.Sc.....	Hamilton Bridge Co., Hamilton, Ont.
1893..	1	Mines, W., B.A.Sc.....	Gt. N. Ry. Elevator Co., Buffalo.
1894..	3	Minty, W., B.A.Sc., Fellow in Mechanical Engineering.....	School of Practical Science, Toronto.
1892..	1	Mitchell, C. H., B.A.Sc., Town Engineer.	Niagara Falls, Ont.
1889..	1	Moberly, H. K., Asst. Mechanical Engineer. ....	Younghiogheny River Coal Company, Scott Haven, Pa.
1891..	1	Moore, J. E. A., C.E., Draftsman.....	Wellman-Seaver Engineering Co., Cleve- land.
1888..	1	Moore, J. H., O.L.S., Town Engineer...	Smith's Falls, Ont.
1881..	1	Morris, J. L., C.E., O.L.S.....	Pembroke, Ont.
1891..	1	Newman, W., O.L.S., City Engineer....	Windsor, Ont.
1894..	3	Nicholson, C. J. ....	Hamilton.
1890..	1	Pedder, J. R., O.L.S., deceased.	
1887..	1	Pinhey, C. H., D. & O.L.S. ....	Soulanges Canal, Co- teau Landing, P.Q.
1892..	1	Playfair, N. L. ....	131 Isabella Street, Toronto.
1892..	1	Prentice, J. M., deceased.	
1897..	1	Proudfoot, H. W. ....	Bonheur, Ont.
1884..	1	Raymer, A. R., Asst. Engineer.....	Pennsylvania, R. R.
1888..	1	Richardson, G. H., Divisional Engineer, C. P. R. ....	Revelstoke, B.C.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1884..	1	Robertson, J., O.L.S....	Coad & Robertson, Civil Engineers, Sur- veyors, etc., Glencoe.
1893..	3	Robertson, J. M. ....	62 Admiral Road, Toronto.
1897..	2	Robinson, A. H., (Post-graduate Course).	School of Practical Science, Toronto.
1895..	1	Robinson, F. J., O.L.S. ....	Fort William.
1891..	1	Robinson, J.K., deceased.	
1887..	1	Roger, J., O.L.S.....	Mitchell, Ont.
1894..	1	Rolph, H. ....	Dawson, N.W.T,
1888..	1	Rose, K. ....	Mexican Southern Ry., Mexico.
1889..	1	Rosebrugh, T. R., M.A., Lecturer in Electrical Engineering ....	School of Practical Science, Toronto.
1892..	1	Ross, J. A., Chief Draftsman ....	L. S. & M. S. Ry., Toledo, O.
1888..	1	Ross, J.E., D. & O.L.S.....	Riverside, Cal.
1890..	3	Ross, R. A., E.E., Consulting Engineer.	Montreal, P. Q.
1893..	1	Russel, R., Engineer's Staff.....	O. A. & P. S. Ry., Pembroke, Ont.
1891..	1	Russel, W., Engineer .....	O. A. & P. S. Ry., Pembroke, Ont.
1897..	4	Scott, W. F., Draftsman.....	Toledo,
1894..	1	Shields, J. D., B.A.Sc.....	Rat Portage, Ont.
1896..	3	Shipe, R. R. ....	Shipe Wood Rim Co., 66 Esplanade W., Toronto, Ont.
1891..	1	Sylvester, G. E., O.L.S.....	Sudbury, Ont.
1897..	3	Smillie, R., (Post-graduate Course) ....	School of Practical Science, Toronto.
1892..	1	Smith, Albert .....	Keystone Bridge Co., Pittsburg, Pa.
1894..	1	Smith, Angus, O.L.S. ....	Ridgetown, Ont.
1893..	1	Speller, F. N., B.A.Sc .....	Speller & Watson, Dawson, N.W.T.
1894..	3	Spotton, A. K.....	Waterous Engine Wk's, Brantford, Ont.

GRADUATES.—*Concluded.*

Year.	Dept.	Name.	Address.
1893..	1	Squire, R. H., O.L.S. ....	City Engineer's Office, Brantford, Ont.
1884..	1	Stern, E. W. ....	Koken Iron Works, St. Louis, Mo.
1895..	3	Stocking, F. T. ....	689 Prospect Avenue, Buffalo, N. Y.
1897..	2	Stull, W. W., (Post-graduate Course)....	School of Practical Science, Toronto.
1891..	1	Symmes, H. D. ....	Engineer Street Ry., St. Catharines, Ont.
1893..	1	Taylor, W. V., O.L.S. ....	Bay of Quinte Ry. and Navigation Co., Gan- anoque, Ont.
1892..	1	Thomson, R. W., B.A.Sc. ....	Consolidated Gold Fields of South Afri- ca, Johannesburg, South African Re- public.
1886..	1	Thomson, T. Kennard, C.E., M.Am. Soc. C.E., Consulting Engineer .....	11 Broadway, N.Y.
1895..	3	Tremaine, R. C. C., B.A.Sc., Manager..	Exeter Electric Light & Power Co., Exeter, Ont.
1886..	1	Tyrrell, H. G., C.E., A.M. Can.Soc.C.E.	Berlin Iron Bridge Co., East Berlin, Conn.
1883..	1	Tyrrell, J. W., C.E., D. & O.L.S. ....	42 James Street, N., Hamilton, Ont.
1893..	1	Watson, R. B. ....	Speller & Watson, Dawson, N.W.T.
1897..	1	Weekes, M. B., (Post-graduate Course)..	School of Practical Science, Toronto.
1897..	1	Weldon, E. A. ....	Glenora & Teslin Lake Ry., Glenora.
1892..	3	White, A. V., Managing Director. ....	The Spoke and Spec- ialty Mfg. Co., Lon- don, N.W. England.
1889..	1	Wickett, T., M.D. ....	.....
1890..	1	Wiggins, T. H., D. & O.L.S., Town Engi- neer. ....	Cornwall, Ont.
1890..	1	Withrow, W. J., Manager. ....	Featherstonhaugh & Co., Montreal, P.Q.
1888..	1	Wright, C. H. C., B.A.Sc., Lecturer in Architecture. ....	School of Practical Science, Toronto.
1894..	3	Wright, R. T. ....	Boston Street Railway Co., 32 E. Brooklyn St., Boston, Mass.

## UNIVERSITY OF TORONTO.

## Degree of Bachelor of Applied Science (B.A.Sc.)

Date of admission.	Name.	Date of admission.	Name.
1893....	Alison, T. H.	1893....	Laschinger, E. J.
1897....	Angus, R. W.	1893....	Lawson, W.
1896....	Armstrong, J.	1893....	Lea, W. A.
1897....	Bain, J. W.	1894....	McAllister, A. L.
1894....	Ballantyne, H. F.	1895....	McAllister, J. E.
1895....	Beauregard, A. T.	1893....	McAree, J.
1896....	Brodie, W. M.	1897....	Macallum, A. F.
1895....	Bucke, W. A.	1893....	McEntee, B.
1894....	Chewett, H. J.	1896....	McGowan, J.
1896....	Dobie, J. S.	1896....	McKinnon, H. L.
1897....	Elliott, H. P.	1894....	McPherson, A. J.
1895....	Ewart, J. A.	1895....	McTaggart, A. L.
1894....	Goodwin, J. B.	1897....	Macbeth, C. W.
1897....	Haight, H. V.	1897....	Martin, T.
1897....	Harkness, A. H.	1894....	Merrill, E. B.
1895....	Herald, W. J.	1893....	Milne, C. J.
1896....	Hull, H. S.	1896....	Mines, W. H.
1894....	James, D. D.	1895....	Minty, W.
1893....	James, O. S.	1894....	Mitchell, C. H.
1895....	Job, H. E.	1895....	Shields, J. D.
1895....	Johnson, S. M.	1894....	Speller, F. N.
1895....	Johnston, A. C.	1894....	Squire, R. H.
1894....	Keele, J.	1893....	Thomson, R. W.
1894....	Laidlaw, J. T.	1896....	Tremaine, R. C. C.
1893....	Laing, A. T.	1893....	Wright, C. H. C.

## Degree of Civil Engineer (C.E.)

Date of admission.	Name.	Date of admission.	Name.
1895....	Bowman, A. M.	1896....	Moore, J. E. A.
1893....	Bowman, F. M.	1885....	Morris, J. L.
1892....	Chewett, H. J.	1892....	Thomson, T. K.
1893....	Innes, W. L.	1894....	Tyrrell, H. J.
1886....	Kennedy, J. H.	1889....	Tyrrell, J. W.
1895....	McAllister, J. E.		

## Degree of Mining Engineer (M.E.)

Date of admission.	Name.
1897.....	Bucke, M. A.

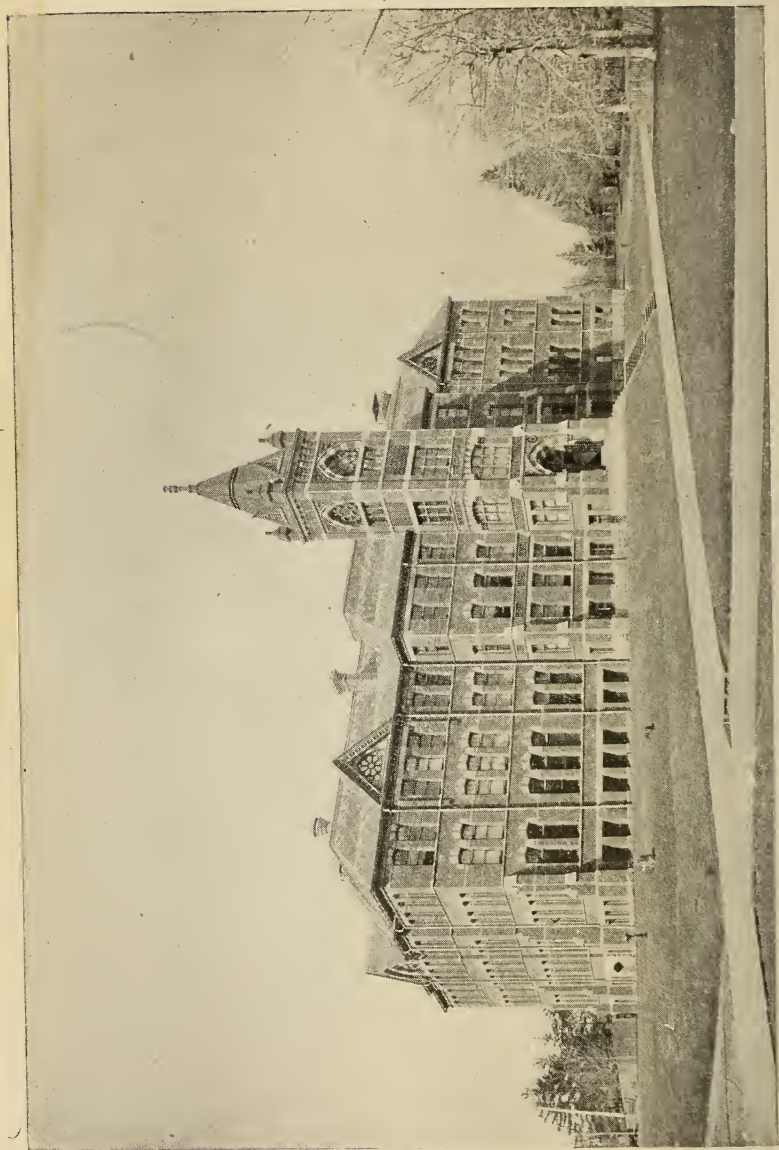
## Degree of Electrical Engineer (E.E.)

Date of admission.	Name.
1896.....	Ross, R. A.

---







SCHOOL OF PRACTICAL SCIENCE, TORONTO.

(Frontispiece.)

CALENDAR

OF THE

School of Practical Science

OF THE

Province of Ontario

TORONTO

Affiliated to the University of Toronto



TWENTY-SECOND SESSION, 1899-1900

WARWICK BROS  
& RUTTER &



TORONTO

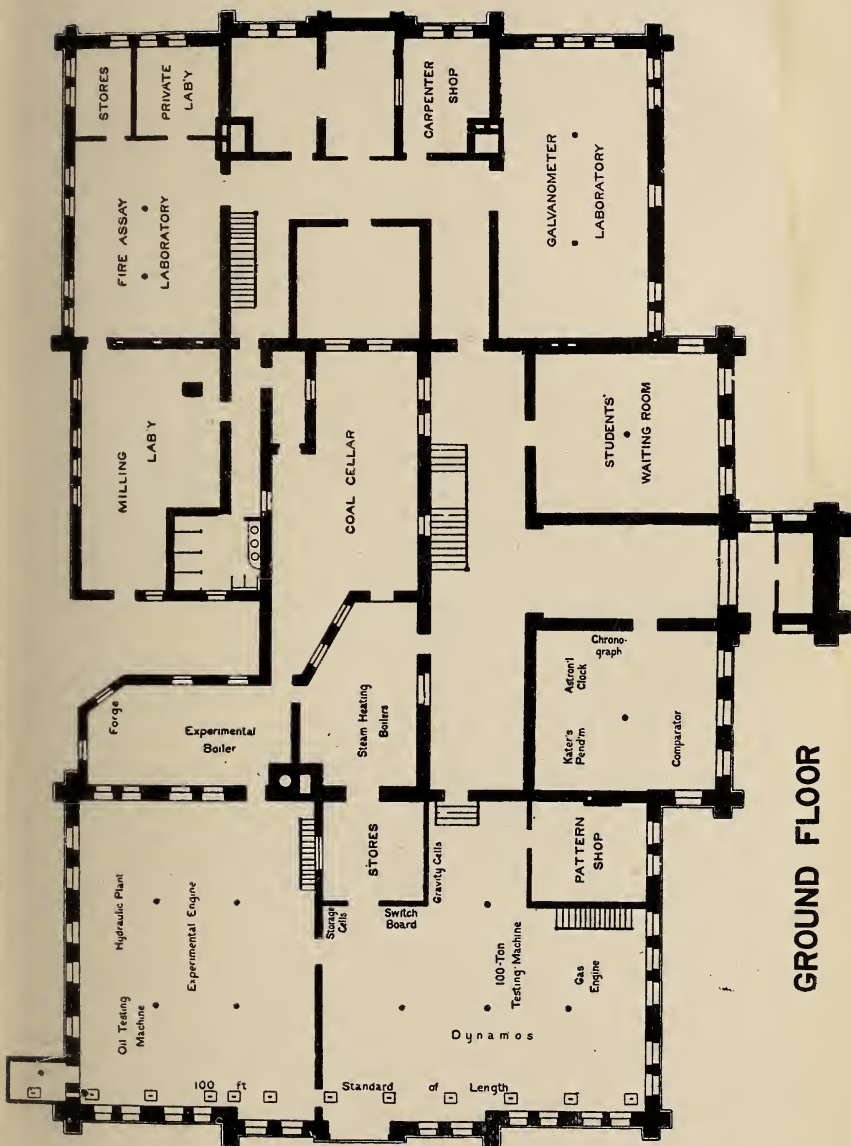
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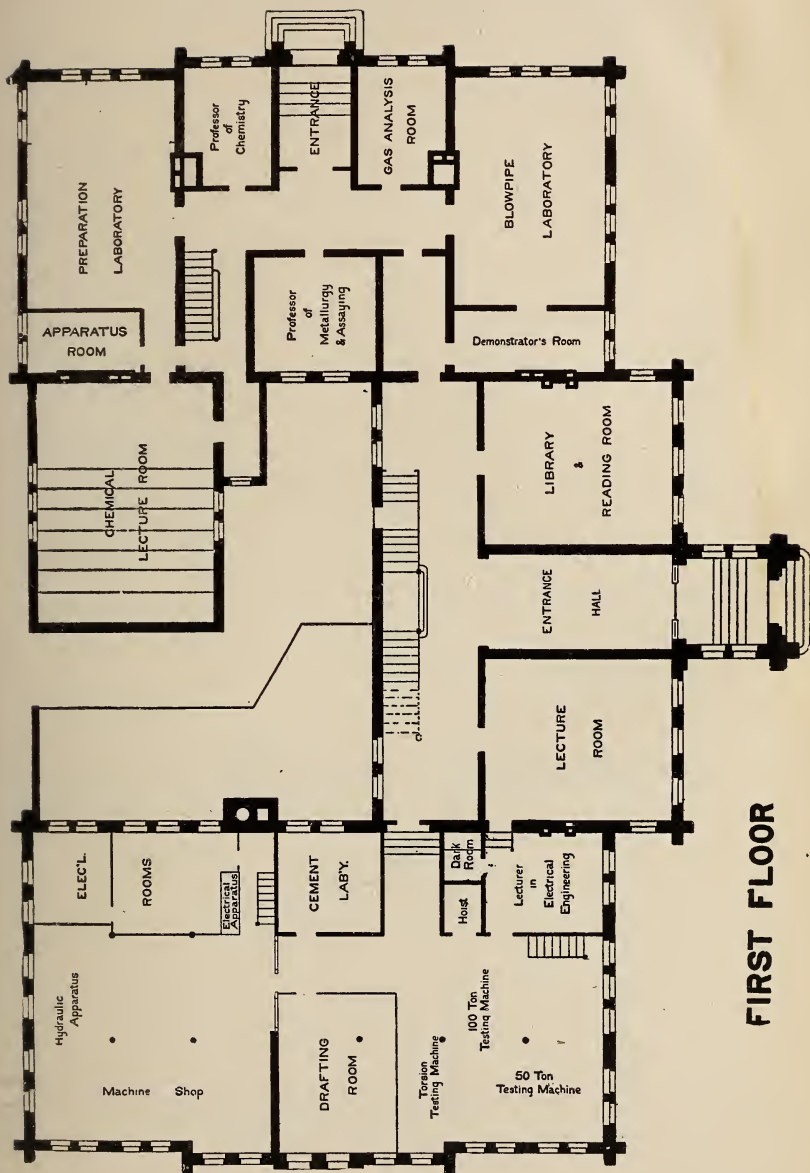
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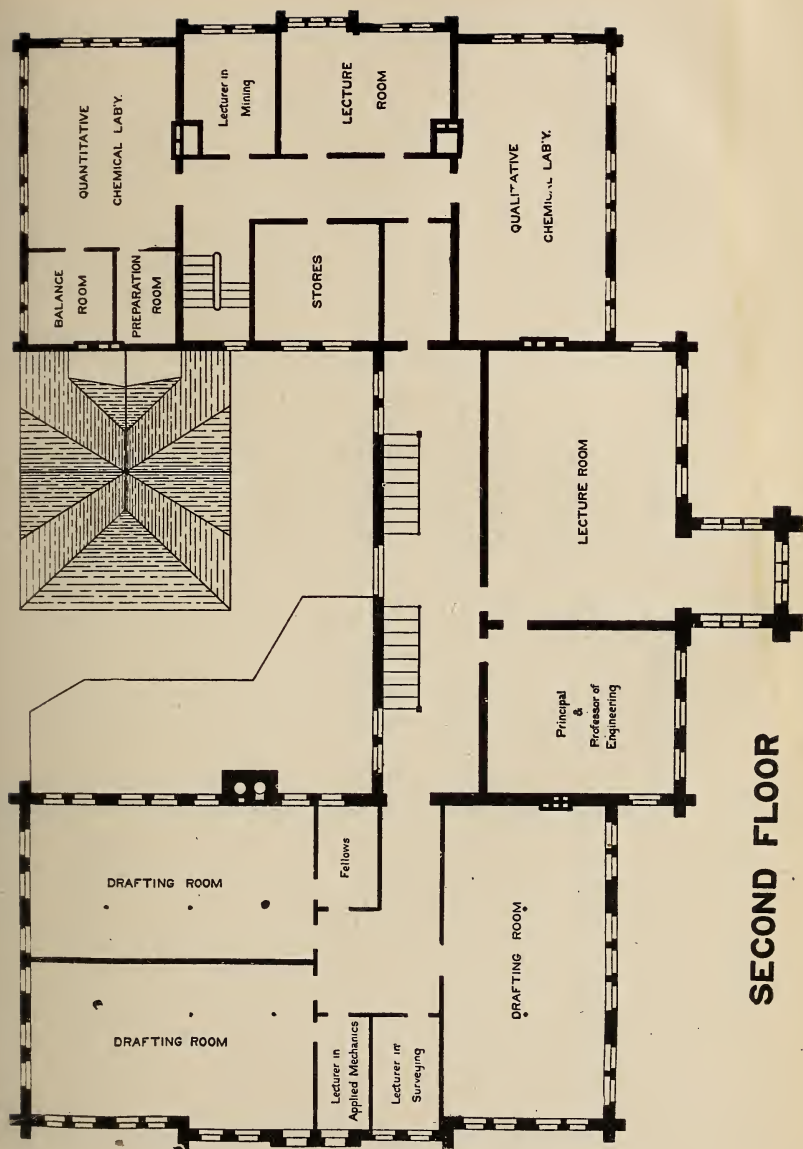
GROUND FLOOR





**FIRST FLOOR**

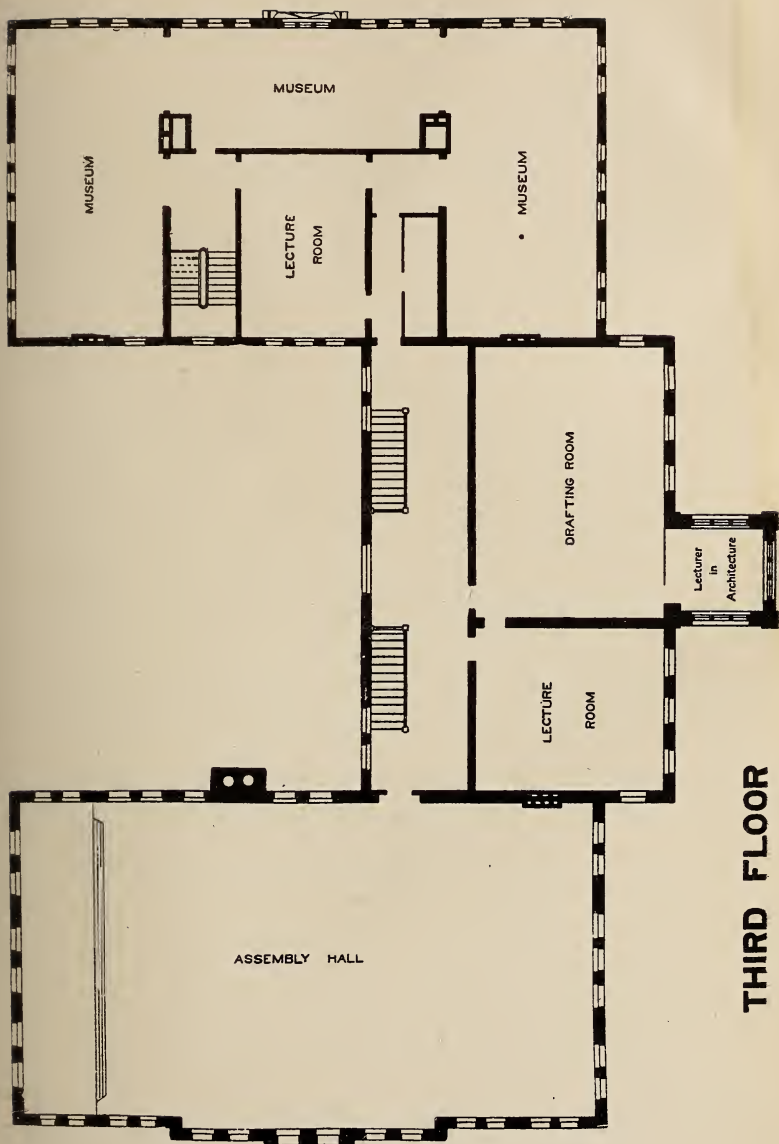




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# 1899.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

25. Meeting of Council.

28. **Entrance Examinations** begin.

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	..	..	..	..	..	..
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

2. **FIRST TERM** begins.

2. Vacation work to be handed in.

2. Supplemental Examinations begin.

13. Meeting of Council.

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
..	..	..	..	..	..	..

10. Meeting of Council.

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

8. Meeting of Council.

21. **FIRST TERM** ends.

# 1900.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

8. **SECOND TERM** begins.

12. Meeting of Council.

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	..	..	..

9. Meeting of Council.

28. Ash Wednesday. Building closed.

# 1900

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

9. Meeting of Council.

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

7. Lectures and Practical Work close  
 9. Meeting of Council.  
 13. Good Friday. Building closed.  
 14. **Annual Examinations** begin.

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

1. **SECOND TERM** ends.  
 1. Last day for B.A.Sc. Thesis.  
 4. Examinations for B.A.Sc. begin.  
 9. Meeting of Council.

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

## TIME TABLE FIRST YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11	*Electricity and Magn'm, 3, 5(a) Drawing, 1, 2, 4 do 3, 5(b)	Drawing, Heat, (c)	Electricity, Drawing, 3, 5(b) do 1, 2, 4 3, 5(a)	Drawing, Heat, (c)	*Elect'y & Magn'm, 3, 5(a) Electricity, 3, 5(b) History of Arch'te, 4 Drawing, 1, 2	10-11
11-12	Drawing, 1, 2, 3, 4 Chemical Lab'y, 5	Chemistry.	Chemistry.	Chemistry.	Pen and Ink, Drawing, 1, 2, 3, 4 4	11-12
12-1	Statics, do 1, 2, 3, 4 Chemical Lab'y, 5(b)	Dynamics.	Descriptive Geometry.	Surveying, Drawing, 1, 2, 3, 4 5	Statics, do 1, 2, 3, 4 5(a)	12-1



# TIME-TABLE.

17

2-3	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4, 1 (b) do	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 5(b) Drawing, 1, 2, 3, 4(b) do	Chem'l Lab'y, 5 do Electrical Lab'y, 3, 5, Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 3, 5(b) Drawing, 1, 2, 4(b) do	Chemical Lab'y, 5 do Electrical Lab'y, 3, 5, Field Work, 1, 2, 4(a) Drawing, 3, do 1, 2, 4 (b)	2-3
3-4	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4, 1 (b) do	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 5(b) Drawing, 1, 2, 3, 4(b) do	Chem'l Lab'y, 5, do 1, 4 (c) Electrical Lab'y, 3, 5, Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 3, 5(b) Drawing, 1, 2, 4(b) do	Chemical Lab'y, 5, do 3 (b) Electrical Lab'y, 3, 5, Field Work, 1, 2, 4(a) Drawing, 3, do 1, 2, 4 (b)	3-4
4-5	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y,t 1, 2, 5 (a) Drawing, 3, 4, 1 (b) do	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 5(b) Drawing, 1, 2, 3, 4(b) do	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5, Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5(a) Field Work, 1, 2, 4(a) Chemical Lab'y, 3, 5(b) Drawing, 1, 2, 4(b) do	Chemical Lab'y, 5, do 3 (b) Electrical Lab'y, 3, 5, Field Work, 1, 2, 4(a) Drawing, 4, do 1, 2, 4 (b)	4-5

1. Civil Engineering ; 2, Mining Engineering ; 3, Mechanical and Electrical Engineering ; 4, Architecture ; 5, Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. (c) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drafting during the balance of the Session.

## TIME TABLE—SECOND YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Rigid Dynamics, 1, 2, 3 History of Arch'te, 4	Surveying (Lect.) Electricity, 3	Calculus, 1, 2, 3, 4	*Astronomy, Lithology, Electricity, Drawing, 4.—2 (b)	*Calculus, 1, 2, 3, 4	9-10
10-11	*Optics Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	Hydrostatics, Metallurgy, (b) (a)	Descriptive Geom'y, 1, 2, 3, 4	*Hydrostatics, Metallurgy, (b) (a)	*Optics, Spherical Trig'y, 1, 2, 3, (a) Drawing, 4 (a)	10-11
11-12	*Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y, 3	*Inorganic Chem'y, 5 Pen and Ink, Drawing, 1, 2, 3	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Strength of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1

# TIME TABLE.

19

2-3	Chemical Lab'y, 2 (a) Mineralogical Lab'y, 1, 2 (b) Electrical Lab'y, 3 Drawing, 4 do 7 (a)	Applied Chemistry.	Physical Lab'y, 3, 5 (a) Orders of Arch'te, 4 Drawing, 1, 2 do 3 (b)	Applied Chemistry.	Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3, 4 (b)	2-3
3-4	Chemical Lab'y, 2 (a) Mineralogical Lab'y, 1, 2 (b) Electrical Lab'y, 3 Drawing, 4 do 7 (a)	Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3, 4 (b)	3-4
4-5	Chemical Lab'y, 2 (a) Mineralogical Lab'y, 1, 2 (b) Electrical Lab'y, 3 Drawing, 4 do 1 (a)	Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	Physical Lab'y, 3, 5 (a) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 1, 3 (b) Ornament, 4	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drafting during the months of October and November and to drafting during the balance of the session.

## TIME TABLE—THIRD YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	*Biology, Thermodynamics, Drawing, 5 1, 2, 3, 4	Hydraulics, 1, 2, 3, 4	*Biology, Thermodynamics, History of Architecture, 5 1, 2, 3, 4	Hydraulics, 1, 2, 3, 4	*Biology, Compound Stress, 1, 3, 4 Mining and Ore Dressing, 2	9, 10
10-11	Drawing, 1, 2, 3, 4	Astronomy and Geodesy, Electricity, Drawing, 1 3, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, Assaying, 2, 5 (a) Drawing, 1, 3, 4, 2 (b)	Astronomy, Mechanics of Machinery, Principles of Dec'n, 1 3, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Drawing, 1, 2, 3, 4	10-11
11-12	Drawing, 1, 2, 3 History of Architecture, 4	Constructive Design, do Drawing, 1, 4 3, 3 (a) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, Assaying, 2, 5 (a) Drawing, 1, 3, 4, 2 (b)	Constructive Design, do Drawing, 1, 4 3, 3 (a) Chemical Lab'y, 2 (b)	Machine Design, 3 Drawing, 1, 2, 4	11-12
12-1	Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Constructive Design, 1, 2, 3, 4 (a) Assaying, 1, 2, 3, 4 (b) Machine Design, 3 (b) Drawing, 1, 4 (b)	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Applied Chemistry.	12-1

2-3	*Physical Lab'y, 3, 5(a) Drawing, 1, 2, 3(b) do Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4(a) Electrical Lab'y, 3(a) Metallurgy, 2, 3, 5(b) Drawing, 1, 4(b)	Descriptive Geometry, 1, 2, 3, 4(a) Theory of Least Squares, 1, 2, 3(b) Drawing, 4(b)	*Practical Biology, 5 Field Work, 1, 2, 4(a) Electrical Lab'y, 3(a) Metallurgy, 2, 3, 5(b) Drawing, 1, 4(b)	*Physical Lab'y, do Field Work, 1, 2, 4(a) Chemical Lab'y, Drawing, 3(b)	3, 5(a) 2-3 1, 4(b) 1, 2, 4(a) 2(b) 3(b)
3-4	*Physical Lab'y, 3(a) *Organic Chemistry, 5 Drawing, 1, 2, 4 do 3(b)	*Organic Chemistry, 5 Field Work, 1, 2, 4(a) Electrical Lab'y, 3 Assaying, 2(b) Drawing, 1, 4(b)	Drawing, 1, 3 do Chem. Lab'y, 2 Pen and Ink, 4(b)	*Practical Biology, 5 Field Work, 1, 2, 4(a) Electrical Lab'y, 3 Assaying, 2(b) Drawing, 1, 4(b)	*Physical Lab'y, do Chemical Lab'y, 2(b) Organic Chemistry, 5 Field Work, 1, 2, 4(b) Drawing, 3(b)	3-1 3, 5(a) 1, 4(b) 2(b) 2(b) 1, 2, 4(b) 3(b)
4-5	*Physical Lab'y, 3, 5(a) Surveying (Lect.), 1, 2, 4(a) Drawing, 1, 2, 3, 4(b)	Field Work, 1, 2, 4(a) Electrical Lab'y, 3 Assaying, 2(b) Drawing, 1, 4(b)	Drawing, 1, 3, 4 Chem. Lab'y, 2	Field Work, 1, 2, 4(a) Electrical Lab'y, 3 Assaying, 2(b) Drawing, 1, 4(b)	*Physical Lab'y, do Chemical Lab'y, 2(b) Field Work, 1, 2, 4(a) Drawing, 3(b)	4-5 3, 5(a) 1, 4(b) 2(b) 1, 2, 4(b)

1. Civil Engineering; 2, Mining Engineering; 3, Mechanical and Electrical Engineering; 4, Architecture; 5, Analytical and Applied Chemistry; \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drafting during the balance of the session.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such intervals as suit the laboratory work.

## FACULTY OF THE SCHOOL.

## PRINCIPAL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.

## MEMBERS OF THE COUNCIL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.,  
Professor of Engineering (Chairman).

W. HODGSON ELLIS, M.A., M.B.,  
Professor of Applied Chemistry.

A. P. COLEMAN, M.A., Ph.D.,  
Professor of Assaying and Metallurgy.

L. B. STEWART, O.L.S., D.T.S.,  
Lecturer in Surveying (Secretary).

C. H. C. WRIGHT, B.A.Sc.,  
Lecturer in Architecture.

T. R. ROSEBRUGH, M.A.,  
Lecturer in Electrical Engineering.

J. A. DUFF, B.A., A. M. Can. Soc. C. E.,  
Lecturer in Applied Mechanics.

G. R. MICKLE, B.A.,  
Lecturer in Mining.

## ASSISTANT INSTRUCTORS.

A. T. LAING, B.A.Sc.,  
Acting Demonstrator in Surveying.

R. W. ANGUS, B.A.Sc.,  
Fellow in Mechanical Engineering.

A. H. HARKNESS, B.A.Sc.,  
Fellow in Civil Engineering.

T. A. WILKINSON, Grad. S. P. S.,  
Fellow in Electrical Engineering.



ASSISTANT INSTRUCTORS.—*Continued.*

J. W. BAIN, B.A.Sc.,  
Fellow in Mining Engineering.

H. W. CHARLTON, B.A.Sc.,  
Fellow in Chemistry.

MEMBERS OF THE FACULTY of the University of Toronto  
whose classes are attended by the Regular Students of the School.

JAMES LOUDON, M.A., LL.D.,  
President and Professor of Physics.

R. RAMSAY WRIGHT, M.A., B.A.Sc.,  
Professor of Biology.

W. H. PIKE, M.A., Ph.D.,  
Professor of Chemistry.

ALFRED BAKER, M.A.,  
Professor of Mathematics.

A. B. MCCALLUM, B.A., M.B., Ph.D.,  
Professor of Physiology.

W. J. LOUDON, B.A.,  
Demonstrator in Physics.

C. A. CHANT, B.A.,  
Lecturer in Physics.

J. C. MCLENNAN, B.A.,  
Assistant Demonstrator in Physics.

ALFRED T. DELURY, B.A.,  
Lecturer in Mathematics.

W. L. MILLER, B.A., Ph.D.,  
Demonstrator in Chemistry.

F. J. SMALE, B.A., Ph.D.,  
Lecturer in Chemistry.

H. J. DAWSON, B.A.  
Fellow in Mathematics.

For information further than that contained in the Calendar, application  
may be made to the Secretary, L. B. STEWART.



# SCHOOL OF PRACTICAL SCIENCE

PROVINCE OF ONTARIO.

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## CALENDAR FOR THE SESSION 1899-1900.

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THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments in science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the school was

entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz :—

1. Civil Engineering (including Sanitary Engineering.)
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

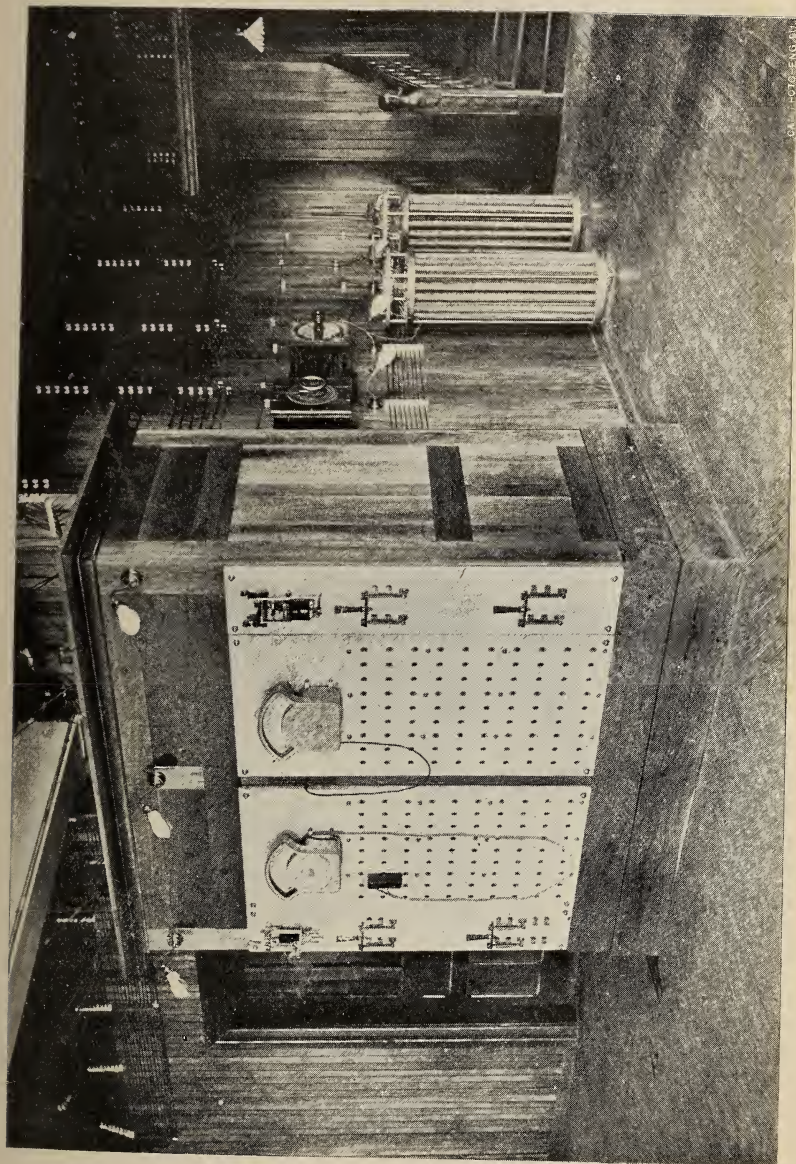
The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

#### DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

#### THE DEGREE OF B.A.Sc.

After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this

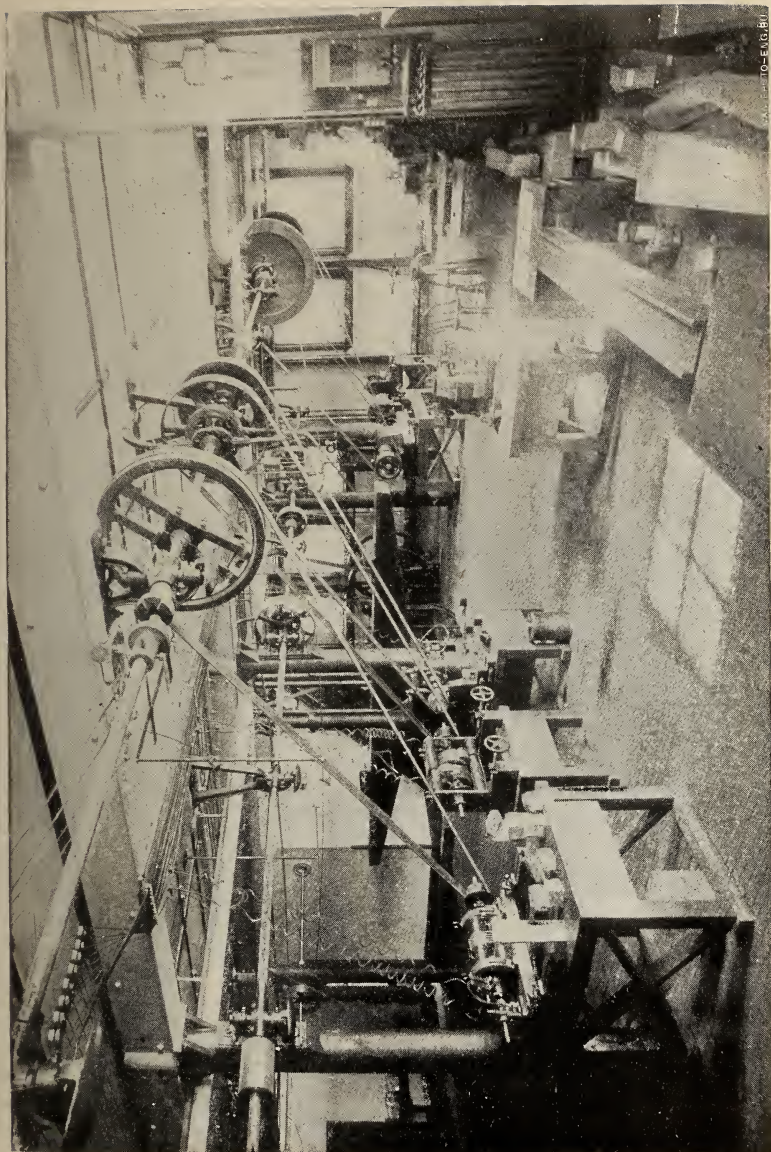


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SWITCH-BOARD.







TO-ENG.BU

DYNAMO ROOM.



list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

#### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.) or Electrical Engineer (E.E.), as the case may be, subject to the rules and regulations established by the University.

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# REGULATIONS

## RESPECTING THE

### School of Practical Science,

Approved by Colonel Sir Casimir Stanislaus Gzowski, K. C. M. G.,  
Administrator of the Government of the Province of Ontario, the  
30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.
2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this vacation shall be determined annually by the Council.
3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :
  - (1) Civil Engineering (including Sanitary Engineering).
  - (2) Mining Engineering.
  - (3) Mechanical and Electrical Engineering.
  - (4) Architecture.
  - (5) Analytical and Applied Chemistry.
4. The Regular Course for the Diploma of the School in each Department shall be three years.

5. Students may enter the Regular Course in any of the above Departments, either (*a*) by presenting certificates of having passed the Matriculation Examination in any University in Her Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (*b*) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects:

*Arithmetic*.—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

*Algebra*.—Elementary rules, easy factoring, highest common measure, lowest common multiple, square foot, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

*Euclid*.—Books I., II, and III; deductions.

*English*.—Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.
7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.
8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.



9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.
10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.

#### ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, pp. 32 and 33.

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (b) order in Council, p. 33

This examination will begin at 9 a.m. Thursday, September 28th, 1899.

Candidates are required to give the Secretary at least two weeks' notice in writing of their intention to take this examination.





*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

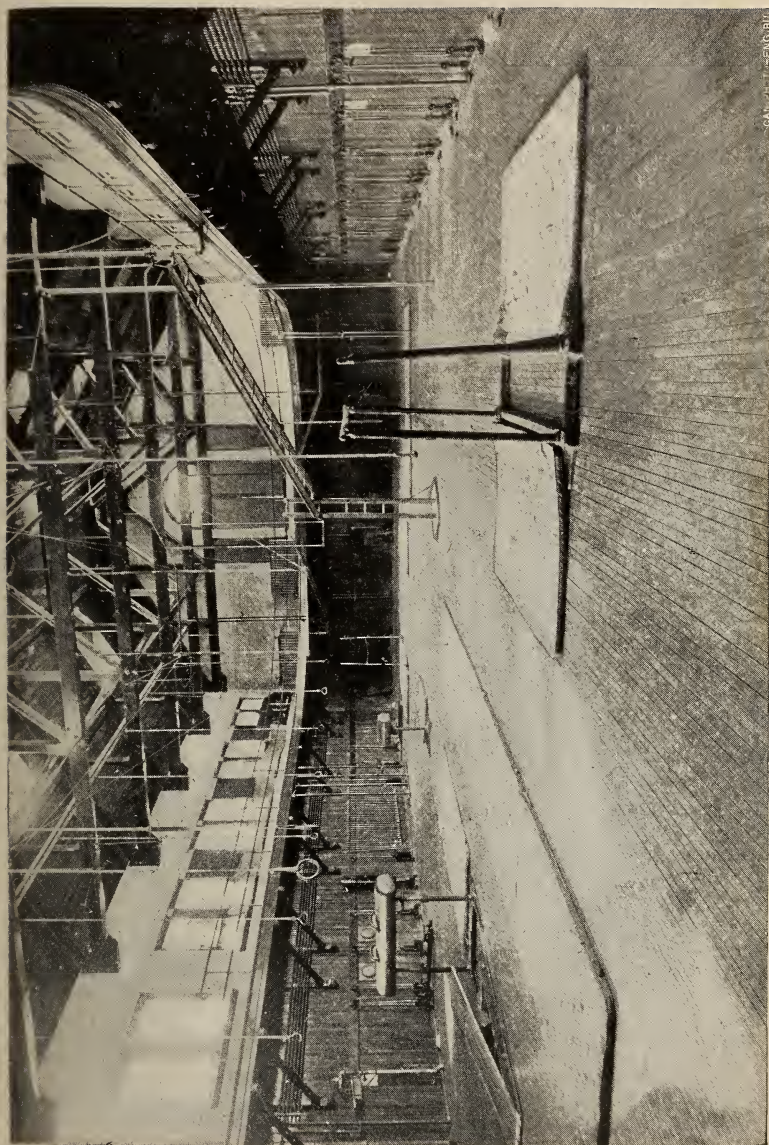
*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma; having fulfilled  
to the satisfaction of the Faculty of the School all the requirements  
thereunto relating.*

*In witness whereof, we have signed this Diploma, at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred and \_\_\_\_\_  
and have caused the seal of this School to be hereunto affixed*

*Chairman.*

*Secretary*





CAMPBELL-REYNOLDS

GYMNASIUM (UNIVERSITY OF TORONTO)



## REGULAR COURSES FOR THE DIPLOMA.

See regulations pp. 32 and 33.

The following are the Departments in which the Diploma is granted:—

- (1) Civil Engineering (including Sanitary Engineering).
- (2) Mining Engineering.
- (3) Mechanical and Electrical Engineering.
- (4) Architecture.
- (5) Analytical and Applied Chemistry.

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

YEAR	DESCRIPTION OF PAYMENT	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering	4. Architecture.	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
I.	Payable in First Term—					
	Sessional Fees . . . . .	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Physical Laboratory . . . . .			1 00		1 00
	Library . . . . .	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General . . . . .	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory . . . . .	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory . . . . .					
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees . . . . .	35 00	35 00	35 00	35 00	35 00
	Total . . . . .	75 00	75 00	76 00	75 00	76 00

YEAR	DESCRIPTION OF PAYMENT	1. Civil Engineering.	2. Mining Engineering	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
II.	Payable in First Term—					
	Sessional Fees.....	39 00	39 00	39 00	39 00	39 00
	Dues—					
	Physical Laboratory....	1 50	1 50	1 50	1 00	1 50
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 50	49 50	46 50	46 00	49 50
	Payable in Second Term—					
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00
	Total.....	89 50	89 50	86 50	86 00	89 50
III.	Payable in First Term—					
	Sessional Fees.....	44 00	44 00	44 00	44 00	44 00
	Dues—					
	Physical Laboratory....	1 00	.....	3 00	2 00	3 00
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	.....	3 00	.....	.....	3 00
	Mineralogical Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	50 00	49 00	56 00
	Payable in Second Term—					
	Sessional Fees.....	45 00	45 00	45 00	45 00	45 00
	Total.....	93 00	98 00	95 00	94 00	101 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.



Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows :

Payable in First Term—

Sessional Fees.....	\$35 00
Dues, Library.....	1 00
Deposits, General ..	2 00

Payable in Second Term—

Sessional Fees.....	34 00
University Fees .....	20 00

Total..... \$92 00

Fourth year students must also pay the deposits of the laboratories in which they work.

OCCASIONAL STUDENTS.—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library fee, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

CERTIFICATES.—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Surveying, Metallurgy and Assaying, Analytical and Applied Chemistry.

Each fellowship is of the value of \$500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September

## REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in October, notice in writing of their intention to take such examinations.

This regulation applies to all regular students and to such occasional students as may be candidates for certificates.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in Drawing the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the

Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserve the right of disposing of the drawings as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

#### **Vacation Work.**

Vacation work must be handed in on or before October 2nd, 1898, otherwise it will not be counted.

Vacation notes must be on construction only, and contain not fewer than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not fewer than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for the theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

#### **Supplemental Examinations, Etc.**

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject, he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the first day of the session. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole

course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or theses indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time table.

### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, unless under such exceptional circumstances as may be deemed sufficient by the Council, which must be fully set forth in a formal petition.

### PRIZE.

The following prize has been established :

Civil Engineering, 3rd Year, \$10 in books. Donor—  
Mr. T. Kennard Thomson, C.E., New York.

### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS,

(APPROXIMATE LIST.)

## I Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Statics.
Euclid.	Dynamics.
Plane Trigonometry.	Descriptive Geometry.
Analytical Geometry. 1, 2, 3, 4.	Surveying . . . . . 1, 2, 3, 4.
History of Architecture . . 4.	Chemistry, Elementary.
Magnetism and Electric- ity . . . . . 3, 5.	Electricity . . . . . 3, 5
	Heat.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes . . . . . 1, 2, 4.
Construction Notes . 1, 2, 3, 4.
Architectural Sketches . . . 4.
Experimental Physics . . 3, 5.
Electricity, Practical . . . 3, 5.
Practical Chemistry.
Practical Mineralogy . . 1, 2, 5.
French and German. . . . . 5.

## II Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus. . . . . 1, 2, 3, 4.	Strength of Materials. 1, 2, 3, 4
Astronomy. . . . . 1.	Rigid Dynamics. . . 1, 2, 3.
Optics.	Theory of Mechanism . . 3.
Hydrostatics.	Descriptive Geometry. . . . .
History of Architecture . . 4.	. . . . . 1, 2, 3, 4.
Orders of Architecture. . . 4.	Surveying . . . . . 1, 2, 4.
1. Civil Engineering.	3. Mechanical and Electrical Engineering.
2. Mining Engineering.	4. Architecture.
	5. Analytical and Applied Chemistry.



History of Ornament. ....4.	Spherical Trigonometry....
Chemistry, Inorganic and .....	1, 2, 3.
Physical .....	5.
Chemistry, Applied. ....	1, 2, 4, 5.
Electricity. ....	3, 5.
	Lithology.....2.
	Metallurgy.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.....	1, 2, 3, 4.
Field Notes.....	1, 2.
Construction Notes.....	1, 2, 3, 4.
Architectural Sketches .....	4.
Experimental Physics.	
Electricity, Practical.....	3.
Thesis (at beginning of session.)	
Chemistry, Practical.	
Mineralogy, Practical. ....	1, 2, 5.
French and German.....	5.

## III Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity. 3.	Theory of Construction ....
History of Architecture...4.	..... 1, 2, 3, 4.
History of Ornament. ....4.	Mechanics of Machinery...3.
Principles of Decoration..4.	Machine Design.....3.
Method of Least Squares....	Hydraulics ..... 1, 2, 3, 4.
..... 1, 2, 3.	Thermodynamics ... 1, 2, 3.
Chemistry, Inorganic and	Descriptive Geometry....
Organic .....	..... 1, 2, 3, 4.
Chemistry, Applied	Practical Astronomy and
Mineralogy and Geology	Geodesy ..... 1.
..... 1, 2, 4, 5.	Surveying and Levelling 1, 2.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

Sanitary Plumbing, Heating and Ventilation..4.	Metallurgy..... 2, 3, 5.
Theory of Compound Stress	Mining and Ore Dressing. 2.
..... 1, 3. 4.	Ore Deposits..... 2.
	Assaying ..... 2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.....	1, 2, 3, 4.
Field Notes.....	1, 2.
Construction Notes.....	1, 2, 3, 4.
Architectural Sketches.....	4.
Experimental Physics ..	1, 3, 4, 5.
Electricity, Practical.....	3.
Thesis (at beginning of session).	
Chemistry, Practical.....	2, 5.
Mineralogy, Determinative..	2, 5.
Assaying .....	2, 5.

## DEPARTMENT OF CIVIL ENGINEERING.

(INCLUDING SANITARY ENGINEERING.)

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers (including under this term Sanitary Engineers).

## I Year.

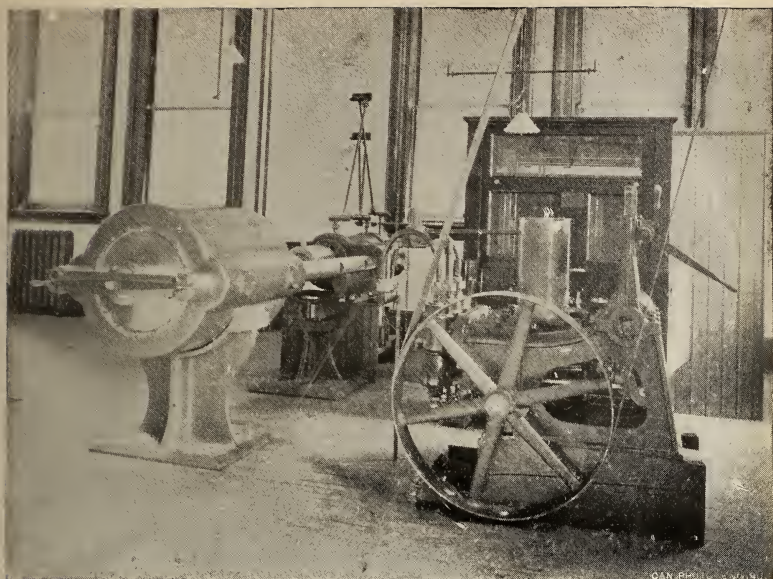
## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

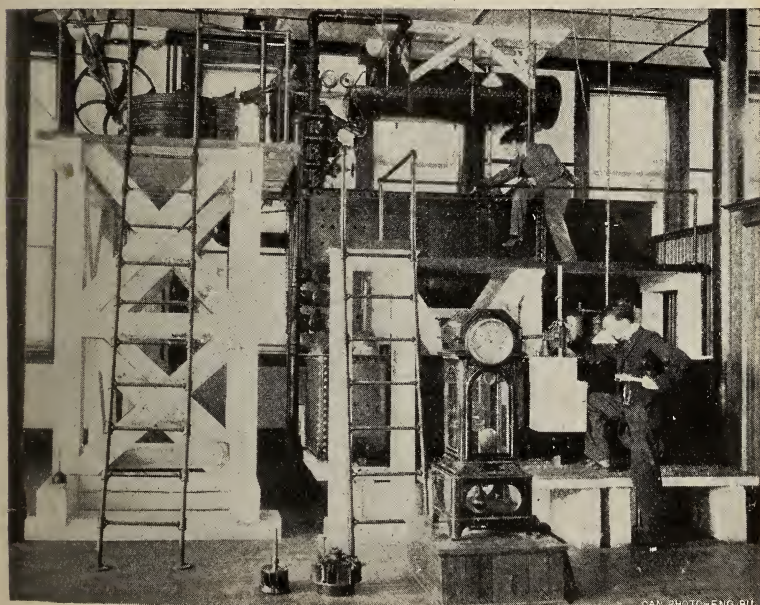
## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |



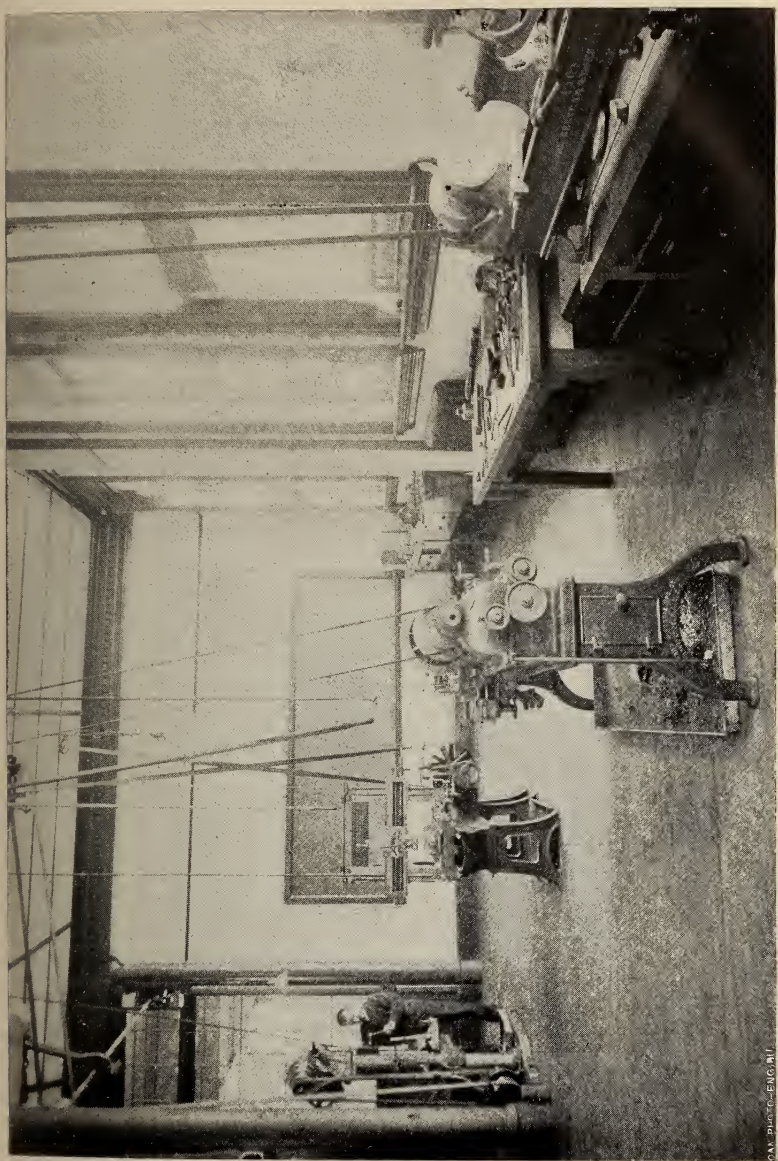
EMERY TESTING MACHINE.



HYDRAULIC PLANT.







MACHINE SHOP.





Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

MINERALOGY,

Introductory course.

PHYSICS,

Heat.

MECHANICS.

Statics and dynamics (with special reference to structures and machines.

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY.

Chemistry of the metals.  
Thermo-chemistry,  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)  
Strength and elasticity of materials.  
Experimental work in engineering laboratory.  
Transit-theodolite surveying.  
Levelling.  
Railway location curves, etc.  
Hydrographic surveying.

## MINERALOGY AND GEOLOGY.

Elements of these sciences.  
Blowpipe practice.  
Determination of minerals.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.  
Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 43 and 101.

## III. Year.

## DRAWING.

Subjects of previous years continued.  
Descriptive geometry—shades and shadows,  
stone cutting, perspective projection.  
Original designs—bridges, roofs, floors, arches,  
etc.

## CHEMISTRY (Applied).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry  
Sanitary Chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).  
Strength and elasticity of materials.  
Theory of construction  
Practical designs—bridges, roofs, floors, arches,  
retaining walls, foundations, etc.  
Thermodynamics and theory of the steam engine.  
Hydraulics, sewerage, water supply.  
Experimental work in engineering laboratory.  
Levelling.  
Profiles, cross sections, field work and plotting.  
Computation of quantities.  
Mathematical theory of surveying instruments.  
Trigonometrical and barometrical levelling.  
Geodesy (considering the earth a sphere.)  
Practical astronomy (treated in the manner  
required for the O.L.S. and D.L.S. examina-  
tions).  
Least squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages 43 and 101.

## II. DEPARTMENT OF MINING ENGINEERING.

This department is designed to afford the necessary preliminary training to students intending to become mining engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection,

Original surveys.

## CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals

Laboratory practice.

## MINERALOGY,

Introductory course.

## PHYSICS,

Heat.

## MECHANICS.

Statics and dynamics, (with special reference to structures and machines).

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit theodolite, plotting, mensuration.

## II. Year

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures from both copies and original notes.

CHEMISTRY.

Chemistry of the metals.

Thermo-chemistry.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location, curves, etc.

Mining surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

Lithology.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics

Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages 43 and 101

## III. Year.

## DRAWING.

Subject of previous years continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

Laboratory practice.

Wet assays.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Thermodynamics and theory of steam engine.

Hydraulics.

Experimental work in engineering laboratory.

Levelling.

Profiles, cross-sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.

Least Squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

Palæontology.

Ore deposits.

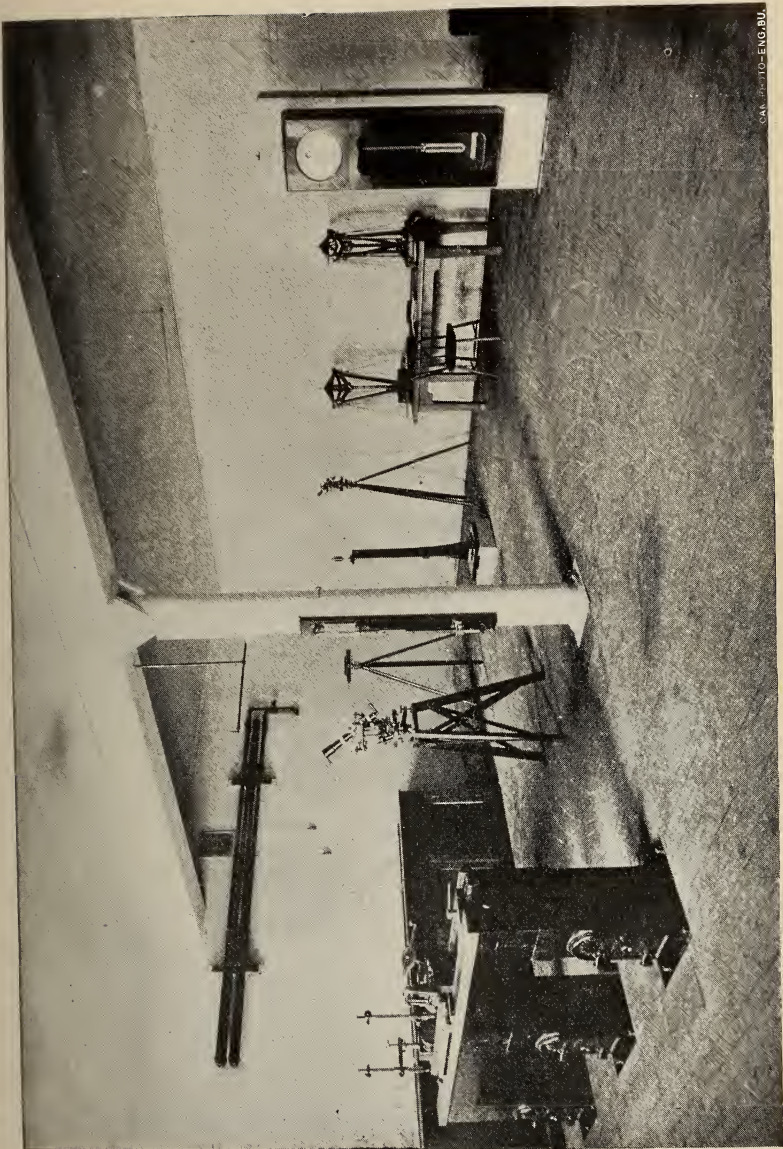
Blowpipe analysis and determinative mineralogy.

Metallurgy of gold, silver, nickel, copper, etc.

Mining and ore dressing.

Assaying.

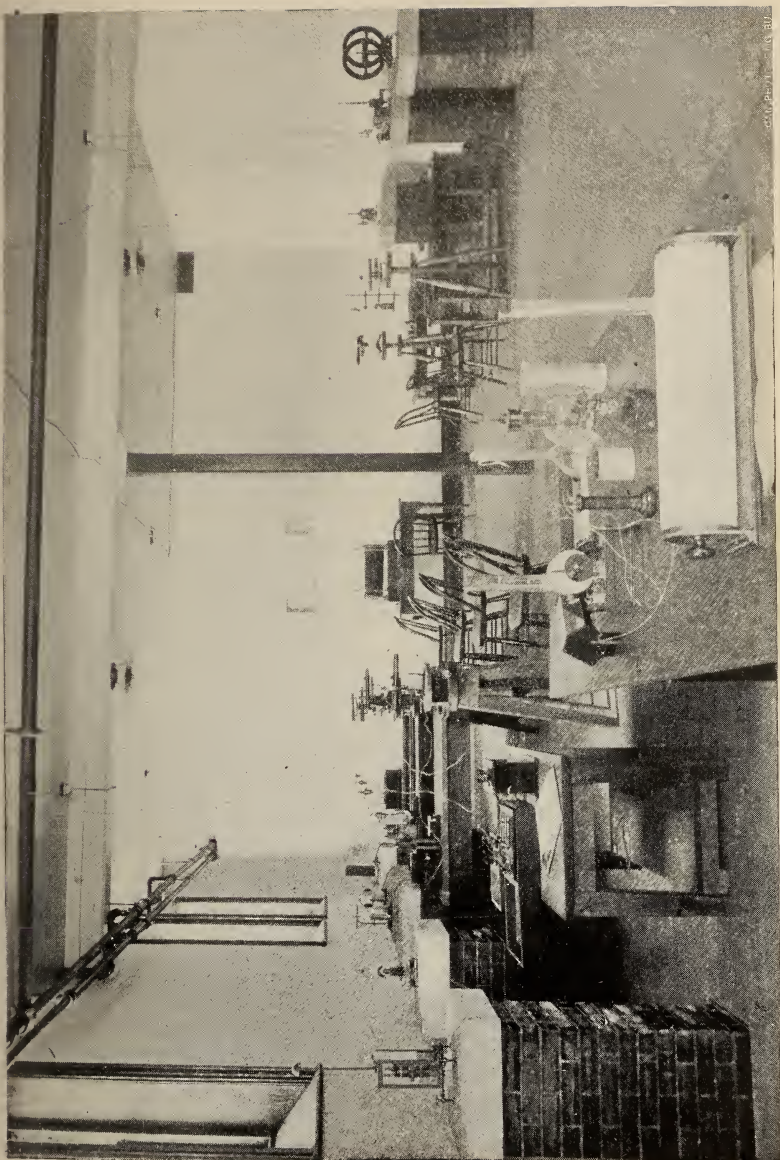




CAK. 10-ENG. BU.

CLOCK ROOM.





GALVANOMETER LABORATORY.



## VACATION WORK.

See pages 43 and 101.

## III. DEPARTMENT OF MECHANICAL AND ELECTRICAL ENGINEERING.

This department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, graphics.

Descriptive geometry in its application to plane-sided solids, orthographical (including isometrical) and oblique projection.

## CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

## MECHANICS.

Statics and dynamics (with special reference to structures and machines).

## SURVEYING.

(Lectures only). Application of trigonometry and principles of measurement.

## PHYSICS.

Heat.

Magnetism and electricity (introductory course .

Electricity (applications of the laws of Ohm, Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course.



## EXPERIMENTAL PHYSICS.

Introductory course.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere.

Machines and structures. (Drawings made from both copies and original notes).

## CHEMISTRY.

Chemistry of the metals

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

Strength and elasticity of materials.

Materials and construction.

Methods and processes.

Experimental work in engineering laboratory.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

Electrical measurements.



EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 43 and 101.

III. Year.

DRAWING.

Subjects of previous year continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

CHEMISTRY (APPLIED .

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

ENGINEERING.

Subjects of previous years continued.

Applied Mechanics :

Mechanics of machinery, machine design,  
thermodynamics and theory of the  
steam engine, hydraulics.

Electricity.

Dynamos and motors.

Application of principles to practical problems  
connected with the design, construction and  
testing of various prime motors and machines.

Experimental work in engineering laboratory.

Least squares.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

## ELECTRICAL LABORATORY.

## ORIGINAL DESIGNS.

Engine and machine design.

## VACATION WORK.

See pages 43 and 101.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

## IV. DEPARTMENT OF ARCHITECTURE.

This department is designed to afford the necessary preliminary training to students intending to become Architects.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography,  
graphics.  
Descriptive geometry in its application to plane  
sided solids, orthographic (including isometric)  
and oblique projection.  
Rendering in pencil and pen and ink.

## CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

## PHYSICS,

Heat.

## MECHANICS.

Statics (with reference to structures).

Dynamics (preliminary to the study of hydraulics).

## SURVEYING.

Principles, chain surveying, mensuration.

## HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

## DRAWING.

Instrumental drawing, drawing from the cast,  
sketching and water color, pen and ink.

Descriptive geometry (curved surfaces).

## CHEMISTRY.

Chemistry of the metals.

Thermochemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## MECHANICS.

Statics (pure and applied).

Strength and elasticity of materials.

Materials of construction.

Experimental work in engineering laboratory.

## SURVEYING.

Use of transit and level.  
Mensuration.

## MINERALOGY AND GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.  
Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## HISTORY OF ARCHITECTURE.

Greek and Roman.  
Romanesque and Byzantine.

## ORDERS AND ELEMENTS OF ARCHITECTURE

## HISTORY OF ORNAMENT.

Ancient.  
Classic—Greek, Roman.

## VACATION WORK.

See pages 43 and 102.

## III. Year.

## DRAWING.

Descriptive geometry.  
Shades and shadows, stone cutting, perspective projection.  
Water color sketching.  
Original designs—floors, trusses, arches, etc.

## CHEMISTRY (APPLIED).

Explosives.  
Artificial lighting.

Photography.  
Industrial chemistry.  
Sanitary chemistry.

THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

HYDRAULICS.

SANITARY SCIENCE.

House drainage and plumbing.  
Ventilation and heating.

SURVEYING.

Levelling, setting out excavation, mensuration.

MINERALOGY AND GEOLOGY.

Economic geology.

EXPERIMENTAL PHYSICS.

Heat, acoustics.

HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to  
England.

HISTORY OF ORNAMENT.

Early Christian ; Gothic and Renaissance.

PRINCIPLES OF DECORATION.

VACATION WORK.

See pages 43 and 102.

V. DEPARTMENT OF ANALYTICAL AND APPLIED  
CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

- Copying from the flat, lettering.
- Descriptive geometry in its application to plane sided solids.
- Orthographic (including isometric) and oblique projection.
- Model drawing.

## CHEMISTRY.

- General principles of chemistry.
- Chemistry of the non-metals.
- Laboratory practice.

## MINERALOGY,

- Introductory course.

## MECHANICS.

- Statics and dynamics.

## PHYSICS.

- Heat.
- Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

- Introductory course.

## PRACTICAL ELECTRICITY.

- Introductory course.

## MODERN LANGUAGES.

- French.
- German.

## II. Year.

## CHEMISTRY.

- Inorganic and physical chemistry.
- Applied chemistry.
- Laboratory work in quantitative and qualitative analysis.

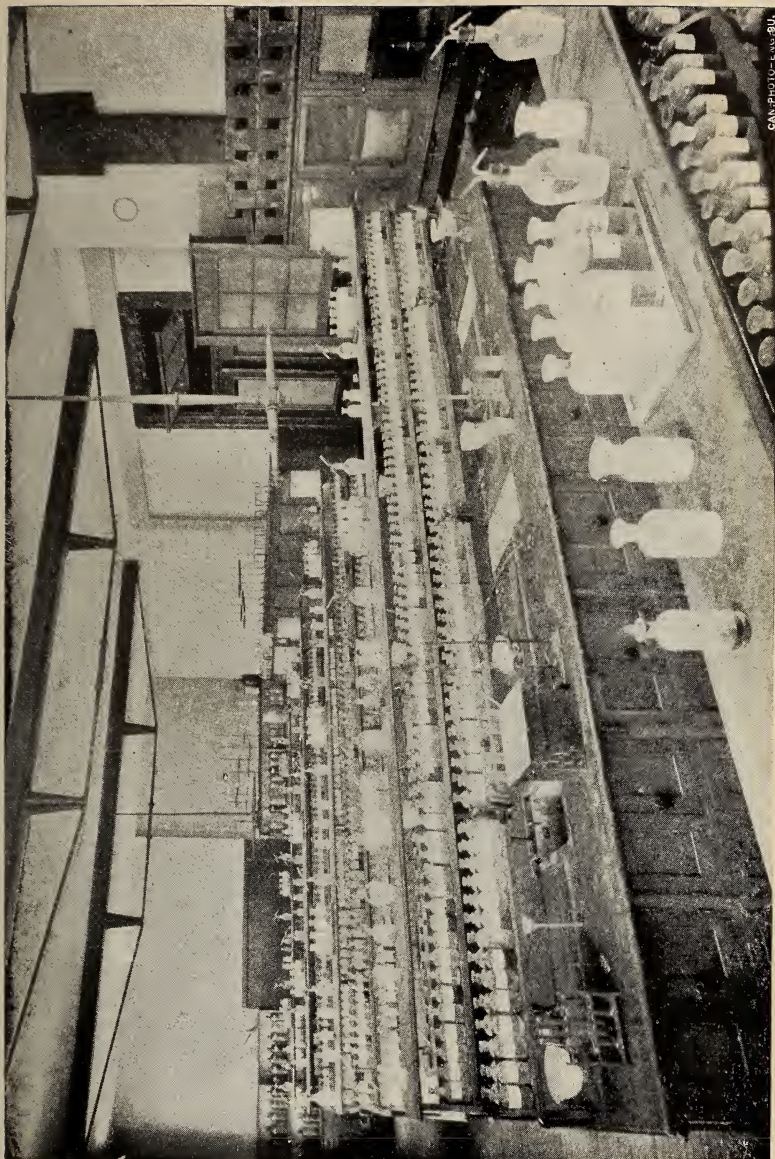
## MINERALOGY AND GEOLOGY.

- Elementary mineralogy and blowpipe practice.
- \*Physical geography, palæontology and geology.

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\* An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.



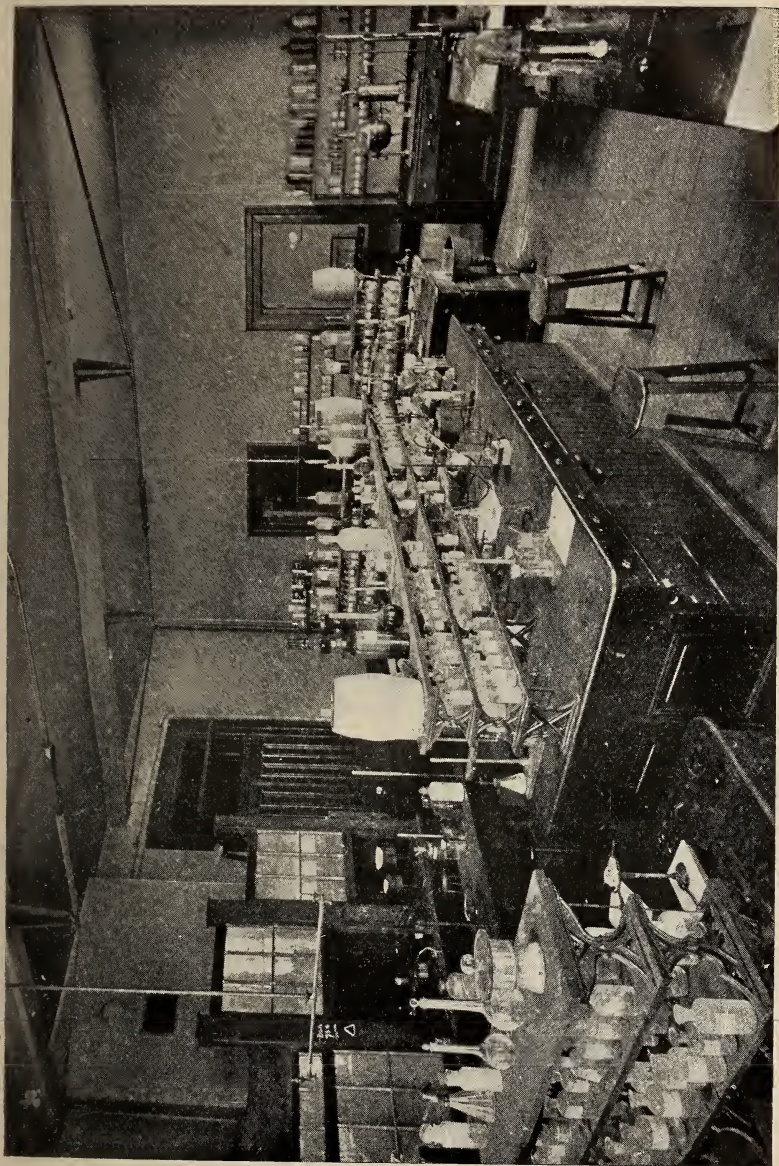


CAN. PHOTO. - E. 40. 80.

CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.







CHEMICAL LABORATORY—QUANTITATIVE ANALYSIS.



METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

Electricity.

EXPERIMENTAL PHYSICS,

ELECTRICAL LABORATORY.

MODERN LANGUAGES.

Students in this and the following years are expected to be able to read chemical books in French and German.

VACATION WORK.

See pages 43 and 102.

III. Year.

CHEMISTRY.

Organic chemistry and chemical physics.

Applied chemistry.

Laboratory work.

MINERALOGY AND GEOLOGY.

†Economic geology.

Blowpipe analysis and determinative mineralogy.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

BIOLOGY.

Terrestrial magnetism.

VACATION WORK.

See pages 43 and 102.

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† An option is permitted between above subject and Physical Chemistry in the University of Toronto.

## THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of optional and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

- A. { Astronomy.  
Goedesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will not be allowed to take fewer than two nor more than three of the subdivisions in any group.



The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year..... 900  
Subdivided as follows :—

Work (reckoned in hours).....	540 marks
Records (notes, drawings, etc.).....	360 marks

#### FOR PASS.

The minimum percentages are :

Work, 75 per cent.....	405 marks
Records, 50 per cent.....	180 "
And two-thirds of the total marks assigned.	600 "

#### FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration,

but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statutes of the University of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they effect the degree of B. A. Sc.

#### DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations :

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.

2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.
3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.
4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.
  - A. { Astronomy.  
Geodesy and Metrology.
  - B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
  - C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
  - B. { Mineralogy and Geology.  
Metallurgy and Assaying.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all candidates who select group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent. of the marks assigned, will be required.

The degree with honors will be conferred on candidates who obtain three out of the four honors possible.

Viz.—Certificate with honors . . . . . (cl. 2.)

Thesis with honors . . . . . (cl. 3.)

Honors in each subject of examination. (cl. 4.)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in May.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of May.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

### SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto.

*Be it enacted :*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.

11. That the following degrees be hereby established, viz.,  
Civil Engineer (C.E.), Mining Engineer (M.E.),  
Mechanical Engineer (M.E.), Electrical Engineer  
(E.E).
- III. That the following be the conditions and regulations  
governing the conferring of the said degrees.
  1. A candidate for one of the said degrees shall hold the  
diploma of the School of Practical Science and  
the degree of Bachelor of Applied Science of the  
University of Toronto, except in the case pro-  
vided for in clause 11 hereunder.
  2. He shall have spent at least three years after receiving  
the degree of Bachelor of Applied Science in the  
actual practise of the branch of Engineering  
wherein he is a candidate for a degree.
  3. Intervals of non-employment or of employment in  
other branches of engineering shall not be included  
in the above three years. It shall not be neces-  
sary that the several periods requisite to make up  
the said three years be consecutive.
  4. Satisfactory evidence shall be submitted to the Uni-  
versity Examiners as to the nature and length of  
the candidate's professional experience for the  
purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or  
written examinations in regard to the candidate's  
experience and competence.

5. The candidate shall prepare an original thesis on some  
engineering subject in the branch in which he  
wishes a degree; the said thesis to be accom-  
panied by all necessary descriptions, details, draw-  
ings, bills of quantities, specifications and esti-  
mates.

The candidate may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the first day of May.
8. The candidate shall be required to present himself for examination in the month of May at such time as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the University.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science. For further particulars apply to the Registrar of the University of Toronto.

#### DOMINION AND ONTARIO LAND SURVEYORS.

Courses of instruction will be given in accordance with the requirements of the Statutes relating to the Dominion and Ontario Land Surveyors, which will enable the graduates to present themselves for final examination before the proper boards, at an earlier period in their apprenticeship than would otherwise be permitted.



Extract from the Provincial Act respecting Land Surveyors and  
Survey of Lands. (R.S.O.)

“ 10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practising Ontario Land Surveyor.”

“ 14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practising land surveyor duly filed as required by section 17 of this Act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed.”

“(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose

of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practising Ontario Land Surveyor."

**Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.

**Extract from the Ontario Architects' Act.**

"Any student who has matriculated in Arts in any University in Her Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

“ 23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

“ 24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

“(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture, to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Register upon payment of such fees as the council may, by regulation, direct.”

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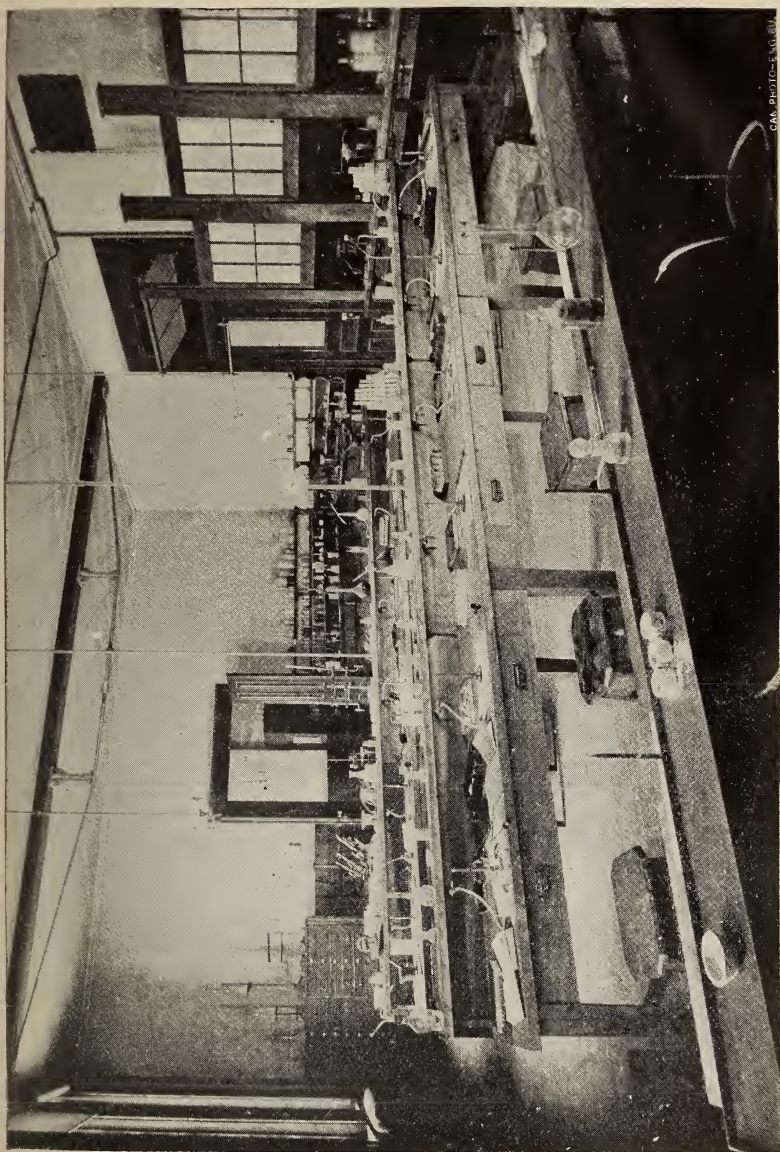
## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

Text-books for the first year marked (*a*) ; second year (*b*) ; third year (*c*) and for fourth or post graduate year (*d*).

### SUBJECTS TAUGHT BY THE FACULTY OF THE SCHOOL.

Subjects.	Instructors.
Organic and Inorganic Chemistry, } Applied Chemistry, }	W. H. Ellis, M.A., M.B., Professor. H. W. Charlton, B.A.Sc., Fellow.
Mineralogy and Geology, Petrography, Metallurgy and Assaying, Mining and Ore-dressing, Milling, German, Statics, Dynamics, Strength of Materials, Theory of Construction, Machine Design, Compound Stress, Hydraulics, Thermodynamics and Theory of the Steam Engine,	A. P. Coleman, M.A., Ph., D., Professor. G. R. Mickle, B.A., Lecturer. J. W. Bain, B.A.Sc., Fellow,
French, Drawing, Architecture, Plumbing, Heating and Ventilation Mortars and Cements, Brick and Stone Masonery, Surveying, Geodesy and Astronomy, Spherical Trigonometry, Least Squares, Descriptive Geometry, Electricity, Magnetism, Dynamo-Electric Machinery, Theory of Mechanism, Mechanics of Machinery, Rigid Dynamics,	J. Galbraith, M.A., Professor. J. A. Duff, B.A., Lecturer. R. W. Angus, B.A.Sc., Fellow.  C. H. C. Wright, B.A.Sc., Lecturer. A. H. Harkness, B.A.Sc., Fellow  L. B. Stewart, D.T.S., Lecturer. A. T. Laing, B.A.Sc, Acting Demonstrator.  T. R. Rosebrugh, M.A., Lecturer. T. A. Wilkinson, Grad. S.P.S., Fellow.





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BLOWPIPE LABORATORY.







MINERALOGICAL COLLECTION.



## Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy.	Alfred Baker, M.A., Professor. A. T. DeLury, B.A., Lecturer. H. J. Dawsen, B.A., Fellow.
Sound, Light, Heat, Electricity and Magnetism, Hydrostatics.	Jas. Loudon, M.A., LL.D., Professor. W. J. London, B.A., Demonstrator. C. A. Chant, B.A., Lecturer. J. C. McLennan, B.A., Assistant Demonstrator. W. H. Pike, M.A., Ph.D., Professor. W. L. Miller, B.A., Ph.D., Demonstrator. F. J. Smale, B.A., Ph.D., Lecturer.
Inorganic and Organic Chemistry, Physical Chemistry.	

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

## Text-Books and Books of Reference.

- Angel—Plane and Solid Geometry.
- Binn—Orthographic Projection.
- Church—Descriptive Geometry (*a*) (*b*).
- Davidson—Projections.
- Low—Machine Drawing and Design.
- Millar—Descriptive Geometry.
- MacCord—Lessons in Mechanical Drawing.
- Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*).
- Vere Foster—Copy Book No. 10, (*a*).
- Warren—Stone Cutting (*c*).
- Worthen—Topographical Drawing.

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

Chain surveys.

Compass and theodolite surveys.

Method of keeping field notes.

Determination of heights and distances.

Plotting.

## LEVELLING.

Longitudinal and cross sections.

Plotting.

## SETTING OUT.

Setting out straight lines and curves

Setting out levels.

## MENSURATION.

Lines, surfaces and solids.

Timber, masonry, iron and earthwork.

Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

## Text-Books.

Brough—Mine Surveying (*b*), (*c*).

Gillespie—Higher Surveying (*b*), (*c*), (*d*).

Henck or Searle—Railway Curves (*b*), (*c*).

Johnson—Theory and Practice of Surveying.

Murray—Manual of Land Surveying (*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

## ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of

determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map constructions are based upon the supposition that the earth is a sphere.

#### ADVANCE COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyers. It is distinguished from the work of the ordinary course not so much by the subjects as by the degrees of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

#### Text-Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher surveying (*b*), (*c*), (*d*).

Gore—Elements of Geodesy (*c*), (*d*).

Green—Spherical and Practical Astronomy (*c*). (*d*).

Helmert—Hohere Geodesie.

Nautical Almanac, 1900 (*c*), (*d*).

#### APPLIED MECHANICS.

##### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

##### THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

##### THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—arches, retaining walls, roofs, bridges, etc.

## DYNAMICS.

Representation and measurement of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc., etc.

## STRENGTH OF THE PARTS OF MACHINES.

## MACHINE DESIGN—

## HYDRAULICS.

Discharge of water through orifices, notches, etc.

Flow in pipes, and open channels. Sewerage, water-works, water-power, water-wheels, turbines, pumps, etc.

## THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

## Test-Books and Books of Reference.

Baker—Masonry Construction (*d*).

Billings—Heating and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc., (*d*).

Carnegie—Pocket Companion,

Carpenter—Heating and Ventilation of Buildings (*c*)

“ Experimental Engineering (*d*).

Du Bois—Graphic Statics.

“ Strains in framed Structures.

Gerhard—House Drainage and Sanitary Plumbing (*c*).

Greene—Trusses and Arches.

Innes—Centrifugal pumps, Turbines and Water Motors (*d*).

Johnson—Modern Framed Structures (*c*), (*d*).

“ Materials of Construction (*d*).

Kennedy—Mechanics of Machinery (*b*), (*c*).



Kidder—Building Construction and Superintendence.

“ Architect and Builders’ Pocket Book.

Lanza—Applied Mechanics.

Low and Bevis—Machine Drawing and Design (*b*), (*c*).

Low—Machine Drawing (*a*), (*b*), (*c*).

Merriman and Jacoby—Roofs and Bridges.

Merriman—Mechanics of Materials (*b* , (*c*), (*d*).

“ Hydraulics (*c*), (*d*).

Patton—Foundations (*d*).

Peabody—Thermodynamics (*d*).

“ Steam Tables (*d*).

Rafter and Baker—Sewage Disposal in the United States.

Rankine —Applied Mechanics (*c*), (*d*).

Reuleaux—The Constructor.

Santo Crimp—Sewage Disposal Works.

Shann—Elementary Treatise on Heat (*c*), (*d*).

Trautwine — Engineer’s Pocket Book.

Unwin—Elements of Machine Design (*c*).

“ Testing of Materials of Construction.

Von Ott—Graphic Statics (*a*).

Williamson—Elasticity (*d*).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel, wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

### Test-Books and Books of Reference.

Auchincloss—Valve and Link motions (*c*).

Goodeve—Elements of Mechanism (*b*).

Halsey—Side Valve Gears.

Kennedy—Mechanics of Machinery (*b*). (*c*).

Rankine—Machinery and Millwork.

Reuleaux—Kinematics of Machinery.

### ELECTRICITY.

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises—

ELEMENTARY ELECTRICITY AND MAGNETISM.

MEASURING INSTRUMENTS—

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

MATHEMATICAL THEORY OF ELECTRICITY.

APPLICATIONS OF ELECTRICITY—

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.

### Text-Books and Books of Reference.

Bedell & Crehore—Alternating Currents.

Carhart & Patterson—Electrical Measurements (*b*), (*d*).

Bedell—Principles of the Transformer (*d*).

Fleming—Alternate Current Transformers, Vol. I and II. (*d*).

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

- Kempe—Electrical Testing (*b*).  
 Loudon & McLennan—Practical Physics (*b*).  
 Stewart & Gee—Practical Physics.  
 Thompson, S. P.—Elementary Electricity and Magnetism.  
     "            Dynamo Electric Machinery.  
     "            Polyphase Currents.  
 Wiene:—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE—

- Egyptian, Assyrian and Persian.  
 Classic.  
 Romanesque and Byzantine.  
 Gothic.  
 Renaissance.

### ORDERS OF ARCHITECTURE.

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

#### Text-books and Books of Reference.

- Fergusson—History of Architecture.  
 Fletcher—A History of Architecture.  
 Gwilt—Encyclopædia of Architecture.  
 Leeds—Orders of Architecture (*b*).  
 Osborne—Art of House Planning (*d*).  
 Owen Jones—Grammar of Ornament.  
 Racinet—L'Ornement Polychrome.  
 Rickman—Gothic Architecture.  
 Sharpe—Seven Periods of Church Architecture.  
 Smith T. Roger—Classic and Early Christian Architecture (*a*), (*b*).  
 Smith, T. Roger—Gothic and Renaissance (*c*).  
 Statham—Architecture for General Readers.  
 Sturgis—European Architecture.  
 Vignole—The Five Orders of Architecture (*b*), (*c*)

### MATHEMATICS AND PHYSICS.

The Pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

#### Text-Books and Books of Reference.

- Ganot—Physics (*b*).
- Hall & Knight—Plane Trigonometry (*a*).
- Loomis—Calculus (*b*).
- Louden & McLennan—Practical Physics (*b*).
- Mackay—Elements of Euclid (*a*).
- Newcomb & Holden—Astronomy (*b*).
- Osborne—Calculus.
- C. Smith—Conic Sections (*a*).
- Hamblin Smith—Hydrostatics (*b*).
- Balfour Stewart—Heat.
- Todhunter—Algebra (*a*).
- “ Spherical Trigonometry (*b*).
- Tyndall—Sound.

### CHEMISTRY.

#### COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

Elementary chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

#### COURSES IN THE UNIVERSITY OF TORONTO.

Inorganic chemistry.

Organic chemistry.

Chemical theory.

Physical chemistry

## Text-Books and Books of Reference.

- Allen—Commercial Organic Analysis.  
Beilstein—Organic Chemistry.  
Bloxam—Chemistry.  
Bloxam & Blount—Chemistry for Engineers and Manufacturers.  
Blyth, A. W.—Poisons.  
Blyth, A. W.—Foods.  
Bolley—Handbuch der Chemischen Technologie.  
Douglas & Johnston—Qualitative Analysis.  
Fresenius—Qualitative and Quantitative Analysis.  
Jones—Practical Chemistry.  
Meyer—Modern Theories of Chemistry.  
“ —History of Chemistry.  
Miller & Smale—Qualitative Analysis.  
Miller, W. A.—Elements of Chemistry.  
Ostwald—Lehrbuch der Allgemeinen Chemie.  
Ostwald—Outlines of General Chemistry.  
Pattison Muir—Thermo-Chemistry, Elements of.  
Post—Chemisch-technische Analyse.  
Remsen—Inorganic Chemistry.  
Richter—Inorganic Chemistry.  
Roscoe & Schorlemmer—Treatise on Chemistry.  
Sadler—Organic and Applied Chemistry.  
Sutton—Volumetric Analysis.  
Thomson—History of Chemistry.  
Thorpe—Dictionary of Applied Chemistry.  
Van't Hoff—Chemistry in Space  
Von Meyer & Jacobson—Lehrbuch der Organischen Chemie.  
Wagner—Chemical Technology.  
Watt—Dictionary of Chemistry.  
Winkler—Gas Analysis.  
Wurtz—History of Chemical Theory.  
“ —Atomic Theory

## MINERALOGY, GEOLOGY, MINING AND METALLURGY.

1. Mineralogy and Geology.
  - Mineralogy and crystallography
  - Geology and palæontology.
  - Petrography.
  - Physical geography.
  - Blowpipe analysis.
  - Determinative mineralogy.
2. Mining and metallurgy.
  - Mining geology.
  - Ore dressing.
  - Metallurgy of iron and steel.
  - Metallurgy of nickel, copper, silver, etc.
  - Assaying.
  - Milling.

**Text-Books and Books of Reference.**

Balling—Metallhuettenkunde.  
 Chapman or Brush—Mineral Tables.  
 Chapman—Mineralogy and Geology of Canada.  
 Dana—Manual of Geology.  
 Geikie—Text-Book of Geology.  
 Harker—Petrography.  
 Ihlseng—Manual of Mining.  
 Kemp—Handbook of Rocks.  
 Kemp—Ore Deposits of the United States.  
 Kuhnhardt—Ore Dressing.  
 Mitchell—Assaying by Crookes.  
 Nicholson—Palæontology.  
 Phillips—Ore Deposits.  
 Phillips and Bauerman—Elements of Metallurgy.  
 Plattner—Manual of Blowpipe Analysis.  
 Roberts-Austen—Metallurgy.  
 Rosenbusch—Petrography.  
 Schnabel—Allgemeine Huettenkunde.



## VACATION WORK.

### THESIS AND CONSTRUCTION WORK.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next following examination.

### CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—City Streets and Pavements

“ THIRD YEAR.—Sewers and Sewerage Systems.

#### Books of Reference.

Byrne—Highway Construction.

Judson—City Roads and Pavements.

Rafter and Baker—Sewage disposal in the United States.

### MINING ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

#### Books of Reference.

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

### MECHANICAL AND ELECTRICAL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-shop Practice.

“ THIRD YEAR.—Foundry Practice.

**Books of Reference.**

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

**ARCHITECTURE.**

For the Second year the following set of freehand pen and pencil sketches is required :

I. Doorway from the object.

II. Staircase “

III. Fireplace with cross section.

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

“ THIRD YEAR.—Twelve water-color studies

**ANALYTICAL AND APPLIED CHEMISTRY.**

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid and Alkali Manufacture.

“ THIRD YEAR.—Coal Tar Products.

**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

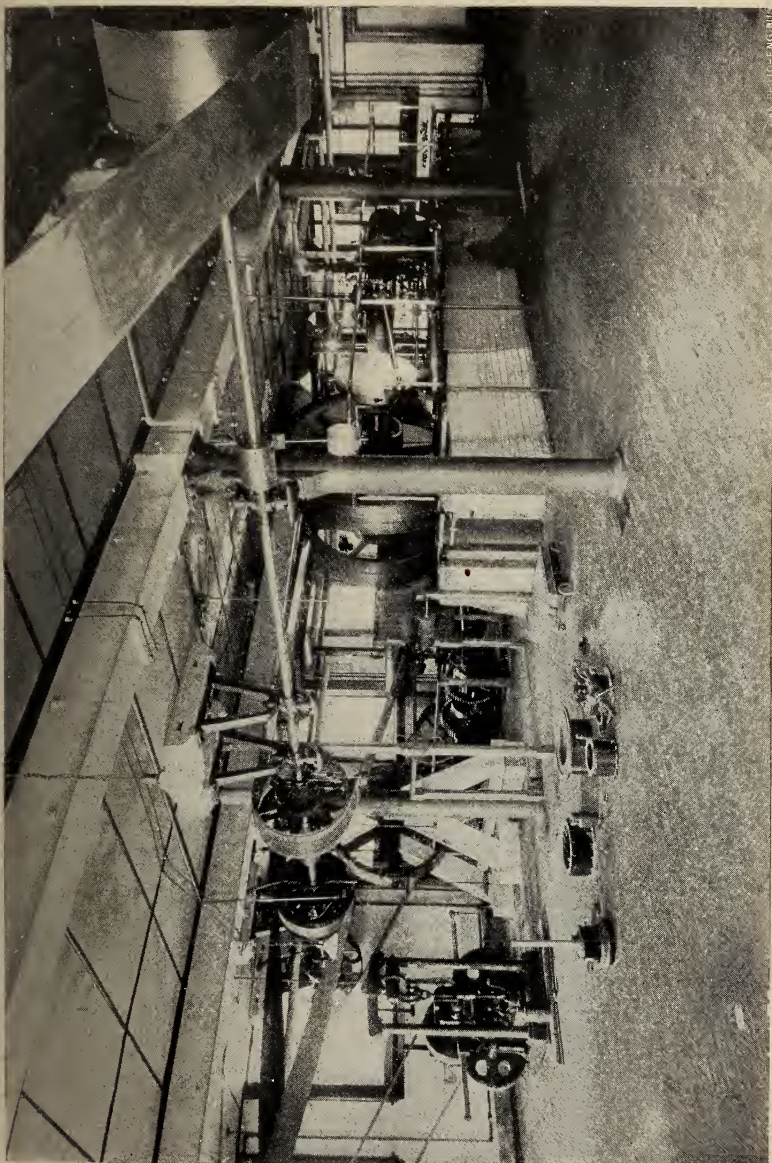
Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

**ENGINEERING LABORATORY.**

This Laboratory occupies two floors, having a total area of 10,000 square feet. It consists of three departments, viz. ;—

(a) The departments for testing materials of construction.



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EXPERIMENTAL ENGINE.







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(b) The department for investigating the principles governing the application of power. This department is sub-divided into the steam laboratory, the hydraulic laboratory and electrical laboratory.

(c) The department for investigating problems connected with standards of length, time, astronomical observations, etc.

In order to prepare specimens for the testing machines, a shop has been fitted up with a number of high-class machine tools specially suited for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs.

The machines in the department for testing materials are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 20,000-pounds Universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity. This machine will take specimens up to forty-eight inches in length.

A Riehle 2,000, and a Riehle 600 pounds cement testing machine. The cement testing-room is fitted with all the usual accessories.

The equipment of the power department is as follows :

A Babcock and Wilcox 52-h.p. boiler.

A Harrison-Wharton 12-h.p. boiler.

A 50-H.P. Brown engine. This engine was constructed specially for experimental investigation. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser, kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers.

A machine for testing lubricating oils and measuring journal friction, built by Riehle Bros. of Philadelphia.

The hydraulic division of the laboratory is furnished with a three-throw pump with double acting cylinders. It has a capacity of 500,000 gallons per 24 hours. There are also large tanks furnished with orifices and weirs, measuring tanks, etc. A three foot jet turbine, a nine-inch McCormick, and a six-inch New American turbine, the latter the gift of the firm of William Kennedy & Sons, Owen Sound, form a part of the same equipment.

The power department is equipped with the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers.

The shafting is driven by a 7-h.p. Otto gas engine, a 20 kw. Edison motor, and the Brown engine above described.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length; a 10-foot Rogers comparator with a graduating attachment; a Kater's pendulum; a Howard astronomical clock and electro-chronograph; a Troughton & Simms 10-inch theodolite, and all the ordinary surveying instruments.

#### ELECTRICAL LABORATORY.

The first section of this laboratory is the engineering division, in which a 20 kilowatt motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, an alter-

nator, and the rotary transformer when used as polyphase dynamo. There are direct current motors of 6 H.P. and 3 H.P., (Edison and Crocker Wheeler), a rotary converter which may be run as a motor from the continuous current circuit and supply either three phase or two phase alternating currents, a three phase induction motor, and smaller motors, of which one is for alternating current.

On the walls, besides rheostats, are four types of transformers, Westinghouse, Stanley, Wagner and Thomson-Houston, and recording meters for continuous and alternating currents. Arc lamps of eight types, are hung around the laboratories, including the Manhattan incandescent arc lamp, Ward, Universal, Thomson-Houston, Ball, an alternating current arc, and the Turbayne, the latter a gift from Mr. W. A. Turbayne.

There are two sets of "Chloride" accumulators available for testing purposes.

A new switchboard has recently been constructed which affords every facility for interconnection of circuits and carries measuring instruments which may be readily introduced into any circuit.

A Thomson balance, a multicellular electrostatic voltmeter, and an high potential electrostatic voltmeter, a Siemen's electro-dynamometer, and standard Weston voltmeters, ammeters and wattmeters furnish the means either of accurate observation or for standardizing of instruments for ordinary use. These are generally used in a separate room to which connection is made.

The second section of the electrical laboratory is a room 24 by 49 ft., in another part of the basement, from which iron has as far as possible been removed. Here ten masonry piers support galvanometers, an electrometer, and other mirror reflecting instruments, and testing work can be done free from disturbing influences.

Fume cupboards and sinks have been provided for work with galvanic and storage cells ; the room is also supplied with Wheatstone bridges, Kohlrausch apparatus for electrolytes, standard divided microfarad condenser, Clark cells and other apparatus. Wires leading from this room to the switchboard allow measurements to be made here in connection with experiments in the other laboratory.

Connections to the 110-volt circuit of the city are accessible in all the rooms.

### THE CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratories will accommodate about twenty students. They are furnished with convenient work tables and fume cupboards, and are supplied with the most recent apparatus for gravimetric, volumetric and gasometric analysis, both scientific and technical.

The apparatus includes a number of excellent balances by the best makers, furnaces for fusion, etc., and for organic combustions for experimental vacuum pan, and filler press.

A very complete set of apparatus for technical gas analysis ; all requisites of the assay of ores and furnace products in the wet way ; the latest forms of Fischer's and Mahler's apparatus for the determination of the heating power of fuel ; facilities for the electrolytic determination of metals, including a Gulcher's thermoelectric pile, spectroscopes, polariscopes, microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying

### BLOWPIPE LABORATORY.

This laboratory will accommodate a class of thirty-six students, and is supplied with all the equipment required for qualitative and quantitative blowpipe work.

### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two gas roasting furnaces, three charcoal crucible furnaces, and one charcoal cupel furnace, a Taylor hand crusher, Blake laboratory crusher, a muller and all other necessary appliances for pulverizing and preparing ores for fire assay. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope; also the necessary appliances for making rock sections by hand. Four petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silvered copper plates, and a Frue Vanner. The concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse-power Edison motor, which is supplied with current from the city circuit. The mill room is also provided with settling tanks for the tailings and concentrates.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a reverberatory furnace for roasting sulphide and arsenical ores ; leaching vats for treating ores by the cyanide process and a chlorination plant.

This completes the equipment for treating gold ores, and makes it possible to extract the gold from the concentrates saved by the Frue Vanner.

### PHYSICAL LABORATORY.

University of Toronto.

The Physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines (Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

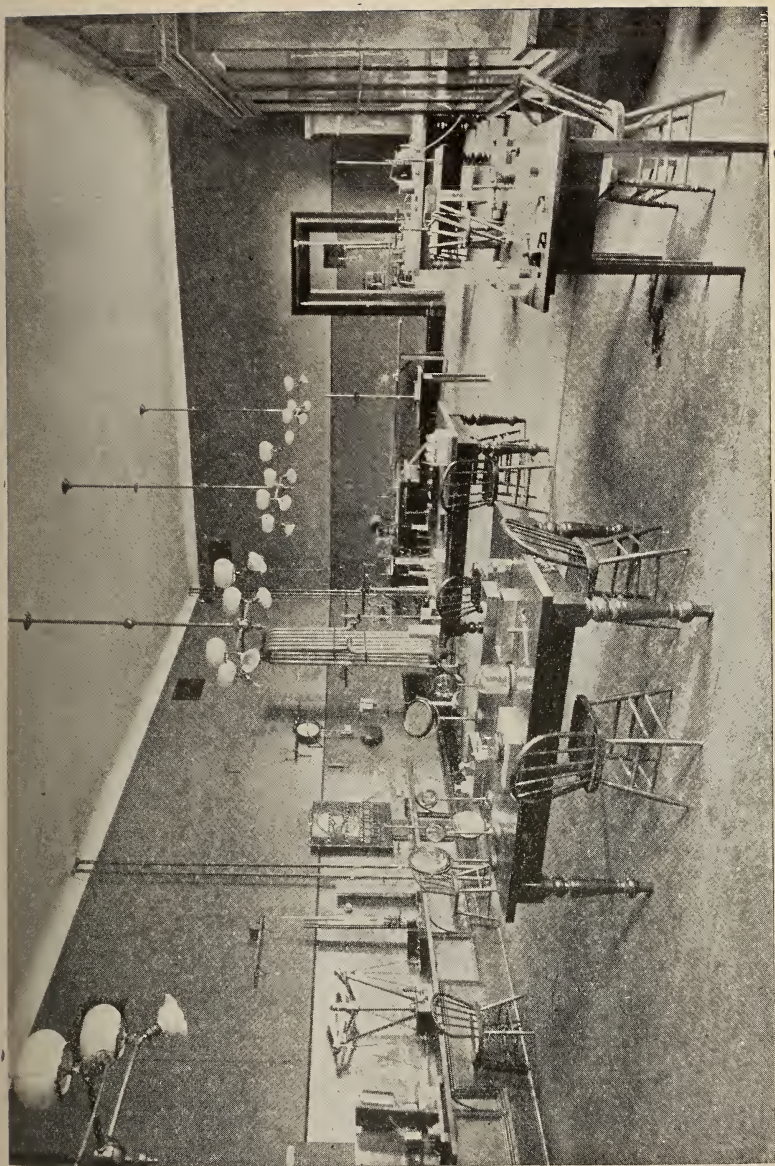
### MODERN LANGUAGES.

No special examinations are held in these languages except in the Fourth Year, but it is expected that every student in a regular course should be able to acquaint himself with the contents of any of the works necessary to his profession, written in these languages. Such books may be prescribed for the terminal examinations.

### LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference on the subjects of study pursued in the School has been formed and is being added to year by year.





ELEMENTARY PHYSICAL LABORATORY (UNIVERSITY OF TORONTO).





ARCHITECTURAL LECTURE ROOM.





## MUSEUMS.

The Geological Museum, includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes ; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive, schistose and sedimentary rocks ; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The paleontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

## EXCURSIONS.

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years. These excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

## THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

## Officers for 1898-9.

<i>President</i> .....	W. E. H. CARTER.
<i>Vice-President</i> .....	T. SHANKS.
<i>Recording Secretary</i> .....	F. W. THOROLD.
<i>Treasurer</i> .....	G. POWER.
<i>Corresponding Secretary</i> .....	R. LATHAM.
<i>Editor</i> .....	J. W. BAIN, B.A.Sc.
<i>Librarian</i> .....	W. W. VAN EVERY.
<i>Assistant Librarian</i> .....	G. HUNT.
<i>Graduates' Representative</i> . . .	W. H. BOYD.
<i>Fourth Year</i> do .....	W. F. GRANT.
<i>Third Year</i> do .....	G. HALL.
<i>Second Year</i> do .....	H. S. HOLCROFT.
<i>First Year</i> do .....	— J. P. RIGSBY.

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society subscribes for the leading engineering journals for the use of the students, and publishes a pamphlet annually, containing the best papers read before the Society.

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## SESSION 1898-9.

## STUDENTS IN ATTENDANCE.

## FIRST YEAR.

## Regular Students.

1. Barrett, R. H ..... Gesto.
3. Batt, T. W ..... West Toronto Junction.
3. Beatty, W. G ..... Fergus.
3. Bell, J. W ..... St. George.
3. Benson, T. B. F ..... Port Hope.
3. Bertram, G. M ..... Toronto.
3. Bowes, W. J ..... Toronto.
3. Brandon, E. T ..... Toronto.
3. Brereton, W. P ..... Bethany.
3. Broughton, J. T ..... Harriston.
3. Chace, W. G ..... St. Catharines.
3. Christie, A. G ..... Manchester.
3. Cockburn, J. R ..... Toronto.
2. Conlon, F. T ..... Thorold.
1. Denison, F. C ..... Toronto.
1. Duff, W. A ..... Hamilton.
2. Eason, D. E ..... Keene.
2. Forbes, D. L. H ..... Toronto.
3. Fotheringham, J. M ..... Bethany.
3. George, R. E ..... Port Elgin.
3. Gibson, N. R ..... Toronto.
2. Hamer, A. T. E ..... Bradford.
1. Harvey, C ..... Indian Head.
3. Laidlaw, A ..... Durham.
3. Larkworthy, W. J ..... Mitchell.
3. McCallum, G. C ..... Welland.

3. McMaster, A. T. C . . . . Toronto.
1. McMillan, G. . . . . South Finch.
3. McVean, H. G . . . . . Dresden.
1. Morley, R. W. . . . . Waterloo.
3. Mustard, W. A. . . . . Brucefield.
3. Pinkerton, W. T. . . . . Lloydtown.
3. Rigsby, J. P . . . . . Toronto.
1. Roberstson, D. F. . . . . Almonte.
1. Rust, H. P . . . . . Toronto.
3. Sauer, M. V. . . . . Toronto.
4. Shepherd, W. F. . . . . St. Marys.
1. Sill, A. J. . . . . Jarvis.
3. Stevenson, W. H. . . . . Lancaster.
3. Sutherland, W. H . . . . Toronto.
1. Twiss, A. T . . . . . Glencoe.
3. Wolverton, A. N . . . . . Lindsay.
3. Zahn, H. J . . . . . Stratford.

Non-Regular Students taking full courses.

1. Alison, J. G. R . . . . . Toronto.
2. Anderson, A. W. . . . . Sutton West.
3. Armstrong, H. J. . . . . Markdale.
3. Beatty, F. R. . . . . Toronto.
5. Beardmore, W. W. . . . . Toronto.
5. Bochmer, C. H. . . . . Berlin.
2. Bolger, E. B. . . . . Lindsay.
3. Dawson, C. N . . . . . Peterboro'.
3. Elwell, W. J . . . . . Toronto.
3. Evans, W. F . . . . . Toronto.
1. Fuller, W. J . . . . . Leamington.
1. Gagne, L. . . . . St. Joseph d'Alma, P.Q.
2. Henry, J. S . . . . . Toronto.
2. Jackson, F. C . . . . . Seaforth.
2. Knight, R. . . . . Bruce Mines.
3. Lacher, B. H . . . . . Toronto.
3. Lytle, C. W. . . . . Toronto.

3. Mace, F. G . . . . . Toronto.
1. Macdonald, W. R . . . . . Toronto.
1. MacLennan, A. L . . . . . Toronto.
3. Mason, H. C . . . . . Potsdam, N.Y., U.S.
3. Minnie, R. S . . . . . Toronto.
3. Mitchell, C. H . . . . . Enniskillen.
4. Pickett, A. B . . . . . St. John, N.B.
3. Reid, T . . . . . Toronto.
1. Ritchie, G. F . . . . . Toronto.
3. Thompson, W. J . . . . . Carberry, Man.
1. Vassar, A. W . . . . . Toronto.
3. Wanless, A. A . . . . . Toronto.
2. Wilkin, J. F . . . . . Toronto.

## SECOND YEAR.

2. Ardagh, E. G. R . . . . . Toronto.
3. Barley, J. H . . . . . Mitchell.
2. Boswell, M. C . . . . . Peterboro'.
2. Burd, J. H . . . . . Parry Sound.
3. Clark, J . . . . . St. Helens.
1. Clarke, F. F . . . . . Deer Park.
3. Clarke, N . . . . . Toronto.
1. Davison, J. E . . . . . Toronto.
3. Dickinson, E. D . . . . . Barrie.
3. Dickson, G . . . . . Toronto.
2. Dixon, H. A . . . . . Eglington.
2. Fullerton, C. H . . . . . Atwood.
3. Guest, W. S . . . . . Elginfield.
3. Henderson, S. E. M . . . . London.
3. Henry, J. A . . . . . St. Ives.
2. Holcroft, H. S . . . . . Toronto.
2. Hunt, G. A . . . . . Galetta.
3. Johnston, H. A . . . . . Toronto.
2. Johnston, J. A . . . . . Pefferlaw.
3. Johnston, J. C . . . . . Toronto.
3. Lumbers, W. C . . . . . Toronto.

2. Mackenzie, J. R. . . . . Toronto.
2. McArthur, R. E. . . . . Toronto.
2. McMillan, J. G. . . . . Dutton.
2. Matheson, W. C. . . . . Milton.
3. Middleton, H. T. . . . . Toronto.
3. Miller, L. H. . . . . Aylmer, Ont.
2. Morrison, J. A. . . . . Winthrop.
2. Neelands, E. V. . . . . Lindsay.
1. Phillips, E. H. . . . . Tilsonburg.
1. Power, G. H. . . . . Toronto.
3. Price, H. W. . . . . Brampton.
2. Roaf, J. R. . . . . Toronto.
2. Saunders, H. W. . . . . Petrolea.
2. Smith, A. H. . . . . Toronto.
1. Tennant, W. C. . . . . Toronto.
2. Thorne, S. M. . . . . Toronto.
1. Thorold, F. W. . . . . Toronto.
1. Weir, H. M. . . . . Brantford.
3. Withrow, F. D. . . . . Toronto.

## THIRD YEAR.

1. Allan, J. L. . . . . Halifax, N. S.
3. Barber, T. . . . . Meaford.
1. Bray, L. T. . . . . Amherstburg.
2. Burnside, T. . . . . Deer Park.
3. Chubbuck, L. B. . . . . Ottawa.
2. Clothier, G. A. . . . . Kemptville.
1. Cooper, C. . . . . Hampden.
2. Coulthard, R. W. . . . . Toronto.
3. Craig, J. A. . . . . Port Hope.
2. Elliot, J. C. . . . . Kelso.
3. Foreman, W. E. . . . . Walkerville.
3. Guy, E. . . . . Columbus.
3. Hall, G. A. . . . . Washington.
3. Hare, W. A. . . . . Dartmouth, N. S.

3. Hemphill, W ..... Toronto.
1. Latham, R ..... Eglington.
2. Monds, W ..... Caledon, East.
1. Patterson, J ..... Thamesford.
2. Perry, F. M ..... Toronto.
3. Pope, A. S. H ..... Toronto.
2. Revell, G. E ..... Woodstock.
3. Richards, E ..... Brockville.
3. Rounthwaite, C. H. E... Collingwood
3. Saunders, G. A ..... Petrolea.
1. Shanks, T ..... Mouse, Creek.
1. Tennant, D. C ..... Toronto.
3. Van Every, W. W ..... Petrolea.
3. Wagner, W. E ..... Toronto.
2. Watt, G. H ..... Walkerton.
1. Willson, R. D ..... Toronto.
3. Yeates, E ..... London.

## FOURTH YEAR.

- Boyd, W. H ..... Toronto.
- Carter, W. E. H... .... Toronto.
- Grant, W. F ..... Toronto.
- Kormann, J. S ..... Toronto.
- Shipley, A. E ..... Cheltenham.
- Williamson, D. A ..... Jarvis.

## Occasional Students.

- Anglin, B. .... Toronto.
- Davidson, J. L ..... Toronto.
- Hamilton, T. E ..... Fergus.
- Manning, W. M ..... Spokam, U. S.
- Ross, D. A ..... Toronto.
- Swannell, F. C ..... Toronto.

## PRIZEMEN.

## Engineering.

- 1879.— I. Year.....J. McAREE ..... 1st prize.
- 1880.— II. Year .....J. L. MORRIS ..... 1st prize.
- 1881.— I. Year .....G. H. DUGGAN..... 1st prize.  
 II. Year.....D. JEFFREY..... 1st prize.
- 1882.— I. Year.....A. R. RAYMER..... 1st prize.  
 I. Year .....E. W. STERN..... 2nd prize.  
 II. Year.....G. H. DUGGAN ..... 1st prize.  
 III. Year.....D. JEFFREY ..... 1st prize
- 1883.— I. Year.....B. A. LUDGATE..... 1st prize.  
 I. Year.....A. M. BOWMAN..... 2nd prize.  
 II. Year. ....A. R. RAYMER..... 1st prize.  
 II. Year.....E. W. STERN ..... 2nd prize.  
 III. Year ....G. H. DUGGAN . . . . . 1st prize.
- 1884.— II. Year.....B. A. LUDGATE..... 1st prize.  
 III. Year.....E. W. STERN ..... 1st prize.  
 III. Year.....A. R. RAYMER..... 2nd prize.
- 1885.— I. Year.....A. F. LOTT ..... 1st prize.  
 I. Year.....J. ROGER ..... 2nd prize.  
 II. Year .....T. K. THOMSON ..... 1st prize.  
 III. Year.....B. A. LUDGATE .... . 1st prize.
- 1886.— I. Year.....C. H. C. WRIGHT..... 1st prize.  
 I. Year.....J. E. ROSS ..... 2nd prize.  
 II. Year.....A. E. LOTT..... 1st prize
- 1887.— I. Year . . .H. E. T. HAULTAIN ..... 1st prize.  
 II. Year.....C. H. C. WRIGHT..... 1st prize.  
 III. Year.....A. E. LOTT..... 1st prize.  
 III. Year .....J. ROGER ..... 2nd prize.
- 1888.— I. Year.....E. B. MERRILL..... 1st prize.  
 I. Year. . . F. M. BOWMAN..... 2nd prize.  
 II. Year.....D. D. JAMES..... 1st prize.  
 III. Year.....C. H. C. WRIGHT ..... 1st prize.



- 1889.— I. Year.....J. K. ROBINSON.....1st prize.  
           I. Year.....G. E. SILVESTER. ....2nd prize.  
       II. Year.....E. B. MERRILL .....1st prize.  
       II. Year.....F. M. BOWMAN .....2nd prize.  
       III. Year.....D. D. JAMES.....1st prize.
- 1890.— I. Year .... C. FAIRCHILD. .... 1st prize.  
       II. Year.....J. K. ROBINSON.....1st prize.  
       III. Year.....F. M. BOWMAN.....1st prize.  
       III. Year.....E. B. MERRILL .....2nd prize.
- 1891.— I. Year.....A. J. MCPHERSON.....1st prize.  
       I. Year.....R. B. WATSON.....2nd prize.  
       II. Year.....J. B. GOODWIN.....1st prize.  
       III. Year.....G. E. SILVESTER.....1st prize.  
       III. Year.....C. W. DILL.....2nd prize.
- 1892.— I. Year.....A. E. BERGEY.....1st prize.  
       I. Year.....R. W. ANGUS .....2nd prize.  
       II. Year.....A. J. MCPHERSON.....1st prize.  
       II. Year.....R. B. WATSON... ....2nd prize.  
       III. Year.....E. J. LASCHINGER.....1st prize.  
       III. Year.....C. FAIRCHILD .....2nd prize.

The grant for prizes was withdrawn at the close of 1892.

#### Architecture.

The prizes in Architecture is the gift of Mr. D. B. Dick, Architect, Toronto.

- 1891.— I. Year .....H. BALLANTYNE.  
 1892.— I. Year.....J. A. EWART.  
 1893.— I. Year.....A. HARKNESS.  
 1894.— I. Year.....E. A. FORWARD.  
 1895.— I. Year.....W. F. SCOTT.  
 1896.— I. Year.....D. MACKINTOSH.

#### Civil Engineering.

The prize in Civil Engineering is the gift of Mr. T. Kenard Thomson, C.E., New York.

- 1897.—III. Year.....M. B. WEEKES.  
 1898.—III. Year.....J. A. STEWART.

## Mechanical and Electrical Engineering.

Donor, Mr. F. A. Riehle, Philadelphia.

1897.—III. Year . . . . . A. T. GRAY.

1898.—III. Year . . . . . F. C. SMALLPIECE.

## Certificates in Mining and Metallurgy.

Date of  
certificate. Name.

1896.. Johnson, G.

1898.. McMillan, A. N.

Date of  
certificate. Name.

1896.. Tye, A. F.

1897.. Webster, E. B.

## Certificate in Electricity.

Date of  
certificate.

Name.

1896..... Sifton, E. I.

## UNIVERSITY OF TORONTO.

## Degree of Bachelor of Applied Science (B.A.Sc.)

Date of  
admission. Name.

1893.. Alison, T. H.

1897.. Angus, R. W.

1896.. Armstrong, J.

1897.. Bain, J. W.

1894.. Ballantyne, H. F.

1895.. Beauregard, A. T.

1896.. Brodie, W. M.

1895.. Bucke, W. A.

1898.. Carpenter, H. S.

1898.. Charlton, H. W.

1894.. Chewett, H. J.

1896.. Dobie, J. S.

1897.. Elliott, H. P.

1895.. Ewart, J. A.

1894.. Goodwin, J. B.

1898.. Gray, A. T.

1897.. Haight, H. V.

Date of  
admission. Name.

1893.. Lawson, W.

1893.. Lea, W. A.

1894.. McAllister, A. L.

1895.. McAllister, J. E.

1893.. McAree, J.

1897.. Macallum, A. F.

1893.. McEntee, B.

1896.. McGowan, J.

1896.. McKinnon, H. L.

1894.. McPherson, A. J.

1895.. McTaggart, A. L.

1897.. Macbeth, C. W.

1897.. Martin, T.

1894.. Merrill, E. B.

1893.. Milne, C. G.

1896.. Mines, W. H.

1895.. Minty, W.

1897.. Harkness, A. H.	1894.. Mitchell, C. H.
1895.. Herald, W. J.	1898.. Robinson, A. H. A.
1896.. Hull, H. S.	1895.. Shields, J. D.
1894.. James, D. D.	1894.. Speller, F. N.
1893.. James, O. S.	1898.. Smillie, R.
1895.. Job, H. E.	1894.. Squire, R. H.
1895.. Johnson, S. M.	1898.. Stull, W. W.
1895.. Johnston, A. C.	1893.. Thomson, R. W.
1894.. Keele, J.	1896.. Tremaine, R. C. C.
1894.. Laidlaw, J. T.	1898.. Weekes, M. B.
1893.. Laing, A. T.	1893.. Wright, C. H. C.
1893.. Laschinger, E. J.	

## Degree of Civil Engineer (C.E.)

Date of admission.	Name.	Date of admission.	Name.
1898..	Alison, T. H.	1895..	McAllister, J. E.
1898..	Ashbridge, W. T.	1898..	Mitchell, C. H.
1895..	Bowman, A. M.	1896..	Moore, J. E. A.
1893..	Bowman, F. M.	1885..	Morris, J. L.
1892..	Chewett, H. J.	1892..	Thomson, T. K.
1893..	Innes, W. L.	1894..	Tyrrell, H. G.
1886..	Kennedy, J. H.	1889..	Tyrrell, J. W.

## Degree of Mining Engineer (M.E.)

Date of admission.	Name.
1897.....	Bucke, M. A.

## Degree of Electrical Engineer (E.E.)

Date of admission.	Name.
1896.....	Ross, R. A.

## GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

Year.	Dept.	Name.	Address.
1892..	1	Alison, T. H., B.A. Sc., C.E., Assistant Engineer .....	Augustus Smith & Co., 39, 41 Cortlandt St., New York.
1892..	1	Allan, J. R., O.L.S.....	Renfrew, Ont.
1892..	1	Anderson, A. G ....	Port Dover, Ont.
1897..	2	Andrewes, E., Assistant Assayer.....	War Eagle Mine, Rossland, B.C.
1894..	3	Angus, R. W., B.A.Sc., Fellow in Mechanical Engineering .....	School of Practical Science, Toronto.
1888..	1	Apsey, J. F., O.L.S., Resident Engineer Baltimore Belt R. R.....	2125 N. Congress St., Baltimore, Md.
1893..	1	Ardagh, J. A., Town Engineer.....	Barrie, Ont.
1895..	1	Armstrong, J., B.A.Sc., Hydraulic Engineer.....	Kakabeka Power Co., Port Arthur.
1888..	1	Ashbridge, W. T., C.E. ....	Toronto, Ont.
1896..	2	Bain, J. W., B A.Sc., Fellow in Mining Engineering.....	School of Practical Science, Toronto.
1888..	1	Ball, E. F., A.M. Can. Soc. C.E., Surveyor and Consulting Engineer.....	Dawson, N.W.T.
1893..	4	Ballantyne, H. F., B.A.Sc.....	Cady, Berg & See, New York.
1894..	1	Barker, H. F.....	Orillia, Ont.
1891..	1	Beatty, H. J., O.L.S. ....	Pembroke, Ont.
1894..	3	Beauregard, A. T., B.A.Sc. ....	New England Engineering Company, Waterbury, Mass.
1894..	1	Bergey, A. E.....	Riter & Conley, Alleghany, Pa.
1895..	3	Blackwood, A. E.....	Sullivan Machinery Co., Claremont, N.H.
1885..	1	Bleakley, F. W.....	Room 46, Sullivan Block, Seattle, W.T.
1895..	1	Boswell, E. J., O.L.S., Assistant Engineer	Crow's Nest Pass Ry , Lethbridge, B.C.
1890..	5	Boustead, W. E., B.A.Sc., deceased.	

## GRADUATES.—Continued.

Year.	Dept.	Name.	Address.
1897..	2	Bow, J. A., Inspector of Mines for Western Ontario .....	Rat Portage, Ont.
1886..	1	Bowman, A.M., C.E., D. & O.L.S., Assistant Engineer Ohio River Improvement	Bellevue, Pa.
1890..	1	Bowman, F. M., C.E., O.L.S., Chief Engineer .....	Riter & Conley, Alleghany, Pa.
1885..	1	Bowman, H. J., D. & O.L.S., A.M. Can. Soc. C.E. ....	Berlin, Ont.
1894..	3	Boyd, D. G., Inspector of Mines .....	Michipicoten, Ont.
1898..	2	Boyd, W. H., (Post graduate course) ...	School of Practical Science, Toronto.
1895..	2	Brebner, G. ....	General Electric Co., Schenectady, N.Y.
1895..	3	Brodie, W.M., B.A.Sc., Draftsman / ...	Pendrith & Co., Toronto, Ont.
1888..	1	Brown, D. B., O.L.S. ....	Ferrocarril de Cabello Blanco — Ciudad de Guatemala, Guatemala.
1888..	1	Brown, G. L., O.L.S., Town Engineer...	Morrisburg, Ont.
1895..	3	Brown, L. L., Locomotive Dept. ....	N. Y., N. H. & H. Ry., New Haven, Conn.
1890..	1	Bucke, M. A., M.E., Mining Engineer...	Tretheway & Bucke, Kaslo, B.C.
1894..	3	Bucke, W. A., B.A.Sc. ....	Royal Electric Co., Montreal, P.Q.
1883..	1	Burns, D., O.L.S., Am. Can. Soc. C.E. ....	Keystone Bridge Co., Pittsburgh, Pa.
1887..	1	Burns, J. C., deceased.	
1896..	2	Burwash, L. T., Mining Engineer .....	N. A. T. & T. Co., Dawson, N.W.T.
1896..	3	Campbell, G. M. ....	Westinghouse Electric Mfg. Co., East Pitts- burgh, Pa.
1895..	4	Campbell, R. G. ....	Buffalo, N.Y.
1888..	1	Canniff, C. M. ....	Luxfer Prism Co., Toronto, Ont.
1889..	1	Carey, B. ....	Engineer's Office, Toronto.
1897..	1	Carpenter, H. S., B.A.Sc. ....	Engineer's Office, Berlin, Ont.
1898..	2	Carter, W. E. H., (Post graduate course)	School of Practical Science, Toronto.
1894..	1	Chalmers, J., O.L.S. ....	Rat Portage, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1889..	1	Chalmers, W. J., Assistant Engineer Ohio River Improvement .....	Vanport, Pa.
1893..	1	Charlesworth, L.C., O.L.S. ....	Stewart & Charlesworth, Collingwood and Rat Portage.
1897..	5	Charlton, H. W., B.A.Sc., Fellow in Chemistry.....	School of Practical Science, Toronto.
1888..	1	Chewett, H. J., B.A.Sc., Am. Can. Soc. C.E., Civil and Mining Engineer.....	83½ York St., Toronto.
1889..	1	Clement, W. A., Roadways Engineer....	City Engineer's Office, Toronto, Ont.
1895..	3	Connor, A. W., B.A.....	Hamilton Bridge Co., Hamilton, Ont.
1890..	1	Corrigan, G. D. deceased.	
1898..	3	Darling, E. H.....	Hamilton Bridge Works, Hamilton, Ont.
1891..	1	Deacon, T. R., O.L.S., Town Engineer..	Rat Portage, Ont.
1896..	2	De Cew, J. A.....	Arrowhead, B.C.
1891..	1	Dill, C. W., Superintendent .....	Clifton, Suspension Bridge, Niagara
1895..	1	Dobie, J. S., B.A.Sc., O.L.S., Mining Engineer .....	Falls, N.Y. Port Arthur.
1890..	1	Duff, J. A., B.A., A.M. Can. Soc. C.E., Lecturer in Applied Mechanics.. ....	School of Practical Science, Toronto.
1883..	1	Duggan, G. H., M. Can. Soc. C.E., Chief Engineer .....	Dominion Bridge Co., Montreal, P.Q.
1893..	1	Dunn, T. H.....	Morrisburg, Ont.
1896..	3	Elliott, H. P., B.A.Sc.....	Technical School, Toronto, Ont.
1890..	1	English, A. B.....	Toronto.
1894..	4	Ewart, J. A., B.A.Sc., Architect.....	Arnoldi & Ewart, Ar- chitects, Ottawa, Ont.
1893..	1	Fairbairn, J. M. R. ....	Kaslo, B.C.
1892..	1	Fairchild C., O.L.S.....	Brantford, Ont.
1893..	4	Fingland, W., Architect.....	307 W. 119th St., New York.



GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1893..	1	Forester, C.....	Toronto, Ont.
1897..	4	Forward, E. A., Assistant... ..	Farran's Point Canal, Ont.
1893.	1	Francis, W. J., A.M. Can. Soc. C.E., Staff of Trent Canal.....	P. O. Box 228, Peter- boro' Ont.
1890..	1	Garland, N. L.....	Eglinton, Ont.
1888..	1	Gibbons, J., D. & O.L.S. ....	Alaska Boundary Sur- vey, Department of the Interior, Ottawa, Ont.
1893..	3	Goldie, A. R., Assistant Manager .....	Goldie & McCulloch Co., Ltd., Galt, Ont.
1892..	1	Goodwin, J. B., B.A.Sc .....	Can. Pac. Ry., Winni- peg, Man.
1898..	1	Grant, W. F., Post Graduate course....	School of Practical Science, Toronto.
1897..	3	Gray, A. T .....	Toronto Electric Motor Co., Toronto.
1895..	1	Guernsey, F. W., Engineer .....	Neepawa Gold Mining Co., Wabigoon.
1896..	3	Gurney, W. C.....	Gurney Foundry Co., Toronto, Ont.
1896 .	3	Haight, H. V., B.A.Sc.....	Canadian Rand Drill Co., Halifax, N.S.
1893..	3	Hanly, S. C.....	Midland, Ont.
1889..	1	Hanning, G. F .....	City Engineer's Office, Toronto.
1895..	4	Harkness, A. H., B.A.Sc.' Fellow in Civil Engineering .....	School of Practical Science, Toronto.
1889..	1	Haultain, H. E. T., Mining Engineer...	Yellowstone Mine, Salmo, B.C.
1885..	1	Henderson, E. E., O.L.S .....	Henderson P.O., Pis- catiquois, Me.
1894..	3	Herald, W. J., B.A.Sc., Mechanical Engineer .....	Leadville, Colo.
1896..	1	Hermon, E. B., D. & O.L.S .....	Gordon, Hermon & Burwell, Vancouver, B.C.
1897..	3	Hicks, W. A. B.....	Northey Mnfg. Co., Toronto, Ont.
1895..	3	Hull, H. S., B.A.Sc., Draftsman .....	Wilmington, Del.
1890..	1	Hutcheson, J., O.L.S., City Engineer ..	Guelph, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1390..	1	Innes, W. L., O.L.S., C.E.....	Ranney & Innes, Civil Engineers and Surveyors, Peterboro', Ont.
1389..	1	Irvine, J .....	Harriston, Ont.
1389..	1	James, D. D., B.A., B.A.Sc., O.L.S....	Rat Portage, Ont.
1391..	5	James, O.S., B.A.Sc., Analytical Chemist.	75 Adelaide E., Toronto.
1392..	1	Jeffrey, D .....	Contractor, Stratford, Ont
1394..	3	Job, H. E., B.A.Sc., Manager.....	Kay Electric Co, Hamilton, Ont.
1394..	1	Johnson, S.M., B.A.Sc, O.L.S., Engineer.	Johnson & McAllister, Anaconda, B.C.
1394..	3	Johnston, A. C., B.A.Sc., Draftsman ...	Westinghouse Electrical Co., East Pittsburgh, Pa.
1394..	1	Jones, J. E., Draftsman.....	Carnegie Steel Co., Pittsburgh, Pa.
1393..	4	Keele, J., B.A.Sc .....	Geological Survey, Ottawa, Ont.
1382..	1	Kennedy, J. H., C.E., O.L.S., Architect, etc .....	St. Thomas, Ont.
1397..	4	King, C. F .....	Warren Chemical & Manufacturing Co., Detroit, Mich.
1384..	1	Kirkland, W. C.....	Illinois Central Ry., New Orleans, La.
1398..	1	Kormann, T. S. (Post Graduate course)..	School of Practical Science, Toronto.
1393..	1	Laidlaw, J. T., B. A. Sc., Consulting Mining Engineer .....	Fort Steele, B.C.
1392..	1	Laing, A. T., B.A.Sc., Acting Demonstrator in Surveying.....	School of Practical Science, Toronto.
1396..	1	Laing, W. F .....	Deacon & Switzer, Rat Portage.
1386..	1	Laird, R., O.L.S .....	Reduction Works, Rat Portage.
1391..	1	Laue, A., O.L.S., Chief Draftsman ....	Structural Department Maryland Steel Co., Sparrows' Point, Md.
1392..	4	Langley, C. E., Architect .....	Langley & Langley, Architects, Toronto.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1892..	1	Laschinger, E. J., B.A.Sc., Chief Draftsman .....	Consolidated Gold Fields of South Africa, Johannesburg, South African Republic.
1893..	3	Lash, F. L., Chief Engineer.....	Sugar Factory, Boedoeeran, Java.
1894..	3	Lash, N. M. ....	Bell Telephone Co., Montreal, Que.
1898..	3	Lavrock, J. E.....	E. Leonard & Sons, London, Ont.
1896..	3	Lawrie, R. R., deceased.....	.....
1892..	5	Lawson, W., B.A.Sc .....	16 Washington Ave., Toronto, Ont.
1892..	3	Lea, W.A., B.A.Sc., Mechanical Engineer	Mexico St. Ry., Mexico.
1887..	1	Lott, A. E., Railway Construction.....	San Antonio de la Huerta, Mexico.
1885..	1	Ludgate, B.A., O.L.S.....	Texas Midland Ry., Terrell, Texas.
1893..	1	McAllister, A. L., B.A.Sc., Draftsman ..	New Jersey Steel and Iron Co., Trenton, N.J.
1891..	1	McAllister, J. E., B.A.Sc., C.E .....	Johnston & McAllister, Trail, B.C.
1893..	1	Macallum, A. F., B.A.Sc .....	Technical School, Toronto, Ont.
1892..	1	McAree, J., B.A.Sc., D.T.S., O.L.S., Mining Engineer and Surveyor .....	Dominion Gold Mining and Reduction Co., Limited, Rat Portage, Ont.
1896..	3	Macbeth, C., B.A.Sc., Manager ..	Ontario Electric Co., London, Ont.
1887..	1	McCullough, A. L., O.L.S., A.M. Can. Soc. C.E.....	Civil and Hydraulic Eng., Petrolea, Ont.
1888..	1	McDowall, R., O.L.S., A.M. Can. Soc. C.E., Town Engineer.....	Owen Sound, Ont.
1884..	1	McDougall, J., B.A., County Engineer ..	Court House, Toronto.
1892..	1	McEntee, B., B.A.Sc., Assistant .....	J. McAree, Rat Portage, Ont.
1888..	1	McFarlane, G. W., O.L.S., Assistant County Engineer.....	Court House, Toronto.
1893..	1	McFarlen, T. J., Assayer .....	Forona Junction, N.S.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1895..	3	McGowan, J., B.A., B.A.Sc. Draftsman.	Keystone Bridge Wks', Pittsburg, Pa.
1898..	4	Mackintosh, D. ....	G. W. Gouinlock, Architect, Toronto.
1885..	1	McKay, O., O.L.S., Railway Engineer..	Windsor, Ont.
1895..	3	McKay, W. N. ....	100 Madison ave., To- ronto, Ont.
1895..	3	McKinnon, H. L., B.A.Sc. ....	Hughes Steam Pump Co., Cleveland, O.
1896..	3	MacMurchy, J. A. ....	Westinghouse Machine Co., East Pittsburg, Pa.
1898..	1	McNaughton, F. W. ....	Wiggins & McNaught- ton, Cornwall, Ont.
1893..	1	McPherson, A. J., B.A.Sc., O.L.S., Town Engineer. ....	Galt, Ont.
1894..	1	McTaggart, A. L., B.A.Sc. ....	Building Dept., Car- negie Steel Co., Pitts- burg, Pa.
1893..	1	Main, W. T. ....	Brampton, Ont.
1888..	1	Marani, C. J., General Agent. ....	Canada Permanent Loan Co., Vancou- ver, B.C.
1893..	1	Marani, V. G., Assistant Engineer. ....	Cleveland Gas, Light & Coke Co., 355 Superior st., Cleve- land, O.
1887..	1	Martin, F., O.L.S., M.D. ....	Hospital for Sick Child- ren, Toronto, Ont.
1896..	1	Martin, T., B.A.Sc., Amalgamator. ....	Kegina Mine.
1895..	1	Meadows, W. W., O.L.S. ....	Rat Portage.
1890 } 1891 }	1 & 3	Merrill, E. B., B.A., B.A.Sc. ....	Brush Electric Co., London, Eng.
1888..	1	Mickle, G. R., B.A., Mining Engineer, Lecturer in Mining. ....	School of Practical Science, Toronto.
1889..	1	Mill, F. X. ....	268 Main St. E., Pitts- burg, Pa.
1892..	3	Milne, C. G., B.A.Sc., Chief Draftsman.	Hamilton Bridge Co., Hamilton, Ont.
1893..	1	Mines, W., B.A.Sc. ....	Gt. N. Ry. Elevator Co., Buffalo.
1894..	4	Minty, W., B.A.Sc., Draftsman. ....	28 Albert Drive, Queen's Park, Glas- gow, Scotland.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1892..	1	Mitchell, C. H., B.A.Sc., C.E., Town Engineer .....	Niagara Falls, Ont.
1889..	1	Moberly, H. K., Asst. Mechanical Engineer .....	Youghiogheny River Coal Company, Scott Haven, Pa.
1891..	1	Moore, J. E. A., C.E., Draftsman .....	Wellman-Seaver Engineering Co., Cleveland.
1888..	1	Moore, J. H., O.L.S., Town Engineer...	Smith's Falls, Ont.
1881..	1	Morris, J. L., C.E., O.L.S. ....	Pembroke, Ont.
1891..	1	Newman, W., O.L.S., City Engineer. ..	Windsor, Ont.
1894..	3	Nicholson, C. J. ....	J. W. Tyrrell, Hamilton, Ont.
1890..	1	Pedder, J. R., O.L.S., deceased.	
1887..	1	Pinhey, C. H., D. & O.L.S. ..	Soulanges Canal, Coteau Landing, P.Q.
1892..	1	Playfair, N. L. ....	131 Isabella Street, Toronto.
1892..	1	Prentice, J. M., deceased.	
1897..	1	Proudfoot, H. W. ....	Bonheur, Ont.
1884..	1	Raymer, A. R., Asst. Engineer .....	P. & L. E. Ry., Pittsburg, Pa.
1888..	1	Richardson, G. H., Divisional Engineer, C.P.R. ....	Revelstoke, B.C.
1884..	1	Robertson, J., O.L.S. ....	Coad & Robertson, Civil Engineers, Surveyors, etc., Glencoe.
1893..	3	Robertson, J. M. ....	62 Admiral Road, Toronto.
1897..	2	Robinson, A. H. A., B.A.Sc. ....	Sudbury, Ont.
1895..	1	Robinson, F. J., O.L.S. ....	Barrie, Ont.
1891..	1	Robinson, J. K., deceased.	
1887..	1	Roger, J., O.L.S. ....	Mitchell, Ont.
1894..	1	Rolph, H. ....	Dawson, N.W.T.
1888..	1	Rose, K. ....	Havana, Cuba.



GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1889..	1	Rosebrugh, T. R., M.A., Lecturer in Electrical Engineering....	School of Practical Science, Toronto.
1892..	1	Ross, J. A., Chief Draftsman .....	L. S. & M. S. R'y., Toledo, O.
1888..	1	Ross, J. E., D. & O.L.S.....	New Westminster, B.C.
1890..	3	Ross, R. A., E.E., Consulting Engineer .	Montreal, P.Q.
1893..	1	Russell, R., Engineer's Staff.....	Crow's Nest Pass Ry.
1891..	1	Russell, W .....	Russel, Poulin & Co., Contractors, Pem- broke, Ont.
1897..	4	Scott, W. F., Draftsman .....	Koken Iron Works, St. Louis, Mo.
1898..	1	Shaw, J. H .....	Beachburg, Ont.
1894..	1	Shields, J. D., B.A.Sc.....	Rat Portage, Ont.
1896..	3	Shipe, R. R.....	Shipe Wood Rim Co., 66 Esplanade W., Toronto, Ont.
1898..	3	Shiple, A. E. (Post-graduate Course) ..	School of Practical Science, Toronto.
1891..	1	Sylvester, G. E., O.L.S .....	Sudbury, Ont.
1898..	3	Smallpiece, F. L.....	Can. Gen. Elec. Co., Toronto.
1897..	3	Smillie, R.....	McMyler Mnfg. Co., Cleveland, O.
1892..	1	Smith, Albert .....	Keystone Bridge Co., Pittsburg, Pa.
1894..	1	Smith, Angus, O.L.S .....	Ridgetown, Ont.
1898..	1	Smith, R. W .....	Rossland, B.C.
1893..	1	Speller, F. N., B.A.Sc.....	Speller & Watson, Dawson, N.W.T.
1894..	3	Spotton, A. K .....	Bertram Engine Wks., Toronto.
1893..	1	Squire, R. H., B.A.Sc., O.L.S.....	City Engineer's Office, Brantford, Ont.
1884..	1	Stern, E. W., Chief Engineer .....	Jackson Architectural Iron Works, New York.
1898..	1	Stewart, J. A.....	Bridge Dept., N.Y.C. Ry., New York.
1895..	3	Stocking, F. T .....	689 Prospect Avenue, Buffalo, N. Y.



GRADUATES.—*Concluded.*

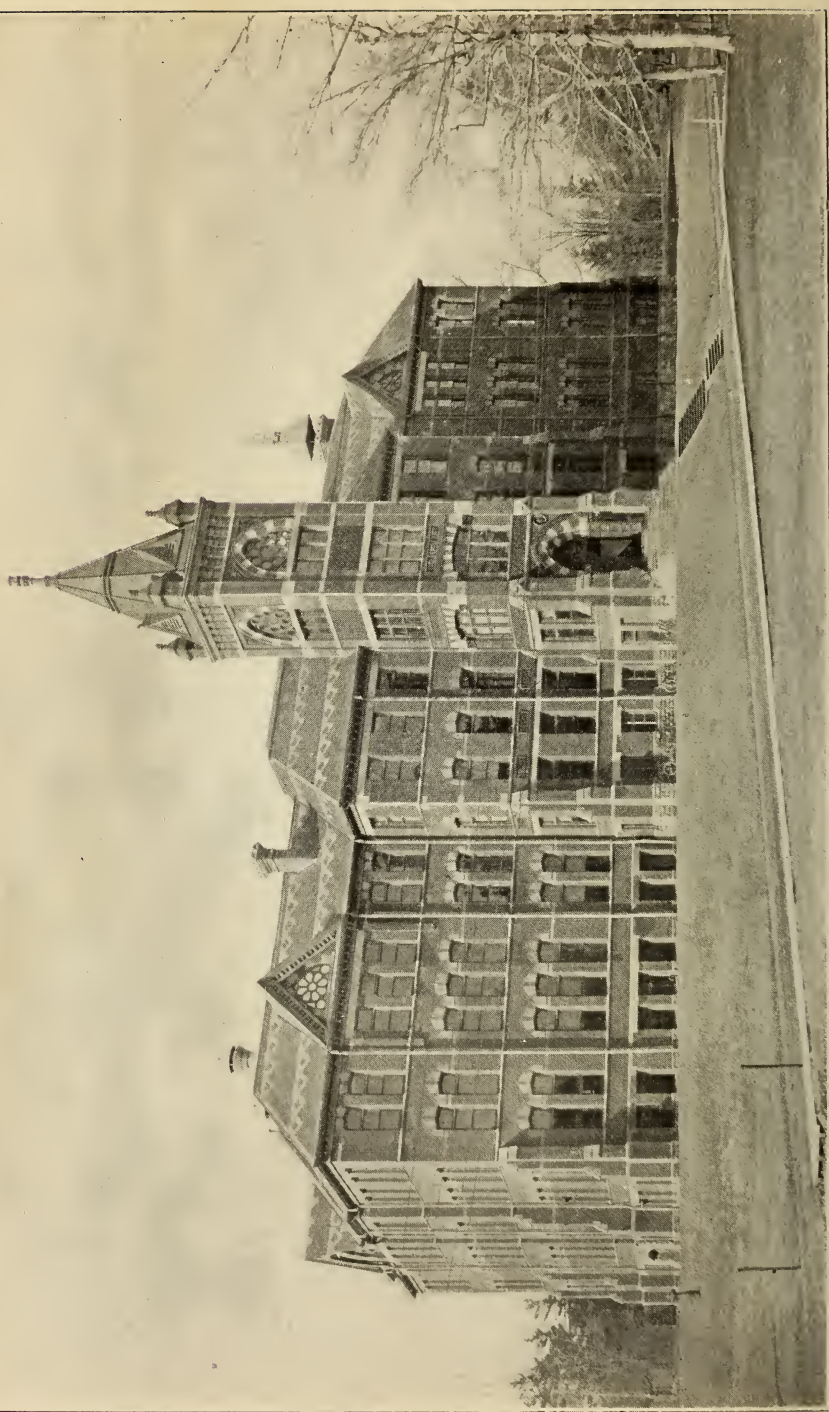
Year.	Dept.	Name.	Address.
1897..	2	Stull, W. W., B.A.Sc .....	Georgetown, Ont.
1891..	1	Symmes, H. D., Manager .....	Street Railway, S t . Catharines, Ont.
1893 .	1	Taylor, W. V., O.L.S .....	Bay of Quinte Ky. and Navigation Co., Gan- anoque, Ont.
1892..	1	Thomson, R. W., B.A.Sc .....	Consolidated Gold Fields of South Afri- ca, Johannesburg, South African Re- public.
1886..	1	Thomson, T. Kennard, C.E., M. Am. Soc. C.E., Consulting Engineer .....	11 Broadway, N.Y.
1895..	3	Tremaine, R. C. C., B.A.Sc., Manager ..	Exeter Electric Light & Power Co., Exeter, Ont.
1886.	1	Tyrrell, H. G., C.E., A.M. Can. Soc. C.E	Berlin Iron Bridge Co., East Berlin, Conn.
1883..	1	Tyrrell, J. W., C.E., D. & O.L.S .....	42 James Street, N., Hamilton, Ont.
1898..	1	Vercoe, H. L .....	Dauphin Ry., Sifton, Man.
1893..	1	Watson, R. B .....	Speller and Watson, Dawson, N.W.T.
1897..	1	Weekes, M. B. B.A.Sc .....	City Engineer's Office, Brantford, Ont.
1897..	1	Weldon, E. A.....	Glenora & Teslin Lake Ry., Glenora.
1892..	3	White, A. V., Managing Director .....	The Spoke and Spec- ialty Mfg. Co., Lon- don, N.W., England.
1889..	1	Wickett, T., M.D .....	Watford, Ont.
1898..	3	Wilkinson, T. A., Fellow in Electrical Engineering .....	School of Practical Science, Toronto.
1898..	3	Williamson, D. A. (Post-graduate Course)	School of Practical Science, Toronto.
1890..	1	Wiggins, T. H., D. & O.L.S., Town En- gineer.....	Cornwall, Ont.
1890.	1	Withrow, W. J .....	Luxfer Prism Co., To- ronto.
1888..	1	Wright, C. H. C., B.A.Sc., Lecturer in Architecture .....	School of Practical Science, Toronto.
1894..	3	Wright, R. T .....	Goldie & McCulloch, Galt, Ont.











(Frontispiece.)

SCHOOL OF PRACTICAL SCIENCE, TORONTO.



CALENDAR

OF THE

School of Practical Science

OF THE

Province of Ontario

TORONTO

*Affiliated to the University of Toronto.*



TWENTY-THIRD SESSION, 1900-1901

WARWICK BROS  
& RUTTER &



TORONTO

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# 1900.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

25. Meeting of Council.

27. **Entrance Examinations** begin.

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

1. **FIRST TERM** begins.

1. Vacation work to be handed in.

1. Supplemental Examinations begin.

12. Meeting of Council.

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

9. Meeting of Council.

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

14. Meeting of Council.

21. **FIRST TERM** ends.

# 1901.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

**SECOND TERM** begins.  
Meeting of Council.

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	3
24	25	26	27	28	..	..

8. Meeting of Council.

20. Ash Wednesday. Building closed.



# 1901.

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

8. Meeting of Council.  
29. Annual Meeting of the Engineering Society.

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..

5. Good Friday. Building closed.  
6. Lectures and Practical Work close  
8. Meeting of Council.  
13. **Annual Examinations** begin.  
22. Thesis for B.A. Sc. to be handed in.  
22. B.A. Sc. Examinations begin.

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

1. **SECOND TERM** ends.  
4. Meeting of Council.

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## TIME TABLE FIRST YEAR.

SESSION 1900-1901.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
8-10	*Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11	*Electricity and Magn'm, 3, 5 (a) Drawing, 1, 2, 4 do 3, 5 (b)	Drawing. *Heat, (c)	Electricity, Drawing, 3, 5 (b) do 1, 2, 4 3, 5 (a)	Drawing. *Heat, (c)	*Elect'y & Magn'm, 3, 5 (a) Electricity, 3, 5 (b) History of Arch'e, 4 Drawing, 1, 2	10-11
11-12	Drawing, 1, 2, 3, 4 Chemical Lab'y 5	Chemistry.	Chemistry.	Chemistry.	Pen and Ink, 4 Drawing, 1, 2, 3, 5	11-12
12-1	Statics, 1, 2, 3, 4 do 5 (a) Chemical Lab'y, 5 (b)	Dynamics.	Descriptive Geometry.	Surveying, 1, 2, 3, 4 Drawing, 5	Statics, do 1, 2, 3, 4 5 (a)	12-1

# TIME-TABLE.

9

2-3	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 do 3 (b) Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 3 do 1, 2, 4 (b)	2-3
3-4	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 do 3 (b) Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 3 do 1, 2, 4 (b)	3-4
4-5	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 do 3 (b) Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 4 do 1, 2, 4 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. (c) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drafting during the balance of the Session.

## TIME TABLE - SECOND YEAR.

SESSION 1900-1901.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Rigid Dynamics, 1, 2, 3 History of Arch'te, 4	Surveying (Lect.) 1, 2, 4 Electricity, 3	*Calculus, 1, 2, 3, 4	*Astronomy, 1 Lithology, 2 (a) Electricity, 3 Drawing, 4, -2 (b)	*Calculus, 1, 2, 3, 4	9-10
10-11	*Optics, Spherical Trig'y, 2, 3 (a) Drawing, 1, 2, 4 (a)	*Hydrostatics, Metallurgy, (b) (a)	Descriptive Geom'y, 1, 2, 3, 4	*Hydrostatics, Metallurgy, (b) (a)	*Optics, Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	10-11
11-12	*Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y, 3	*Inorganic Chem'y, 5 Pen and Ink, 4 Drawing, 1, 2, 3	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Str.ngth of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1

2-3	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	Applied Chemistry.	*Physical Lab'y, 3, 5 (a) Orders of Arch'te, 4 Drawing, 1, 2 do 3 (b)	Applied Chemistry.	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing,	3, 5 (a) 2 (b) 1, 2, 4 (a) 1, 3, 4 (b)	2-3
3-4	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing,	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing,	3, 5 (a) 2 (b) 1, 2, 4 (a) 1, 3, 4 (b)	3-4
4-5	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing,	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, History of Ornament,	3, 5 (a) 2 (b) 1, 2, 4 (a) 1, 3 (b) 4	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drafting during the balance of the Session.

## TIME TABLE—THIRD YEAR.

SESSION 1900-1901.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10 *Biology, Thermodyna- mics, 1, 2, 3 Drawing, 4	Hydraulics, 1, 2, 3, 4	*Biology, Thermodyna- mics, 5 1, 2, 3 History of Arch <sup>e</sup> , 4	Hydraulics, 1, 2, 3, 4	*Biology, 5 Compound Stress, 1, 3, 4 Mining and Ore Dressing 2	9-10
10-11 Drawing, 1, 2, 3, 4	Astronomy and Geodesy, 1 Electricity, 3 Drawing, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 1, 3, 4	Astronomy, 1 Mechanics of Machinery, 3 Principles of Dec'n, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Drawing, 1, 2, 3, 4	10-11
11-12 Drawing, 1, 2, 3 History of Archi- tecture, 4	Constructive Design, 1, 4 do, 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 1, 3, 4	Constructive Design, 1, 4 do, 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Machine Design, 3 Drawing, 1, 2, 4	11-12
12-1 Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Constructive Design, 1, 2, 3, 4 (a) Assaying, 2 (b) Machine Design, 3 (b) Drawing, 1, 4 (b)	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Applied Chemistry.	12-1



# TIME-TABLE.

2-3	*Physical Lab'y, 3, 5 (a) do Drawing, 1, 2 Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Metallurgy, 2, 3, 5 (b) Drawing, 1, 4 (b)	Descriptive Geometry, 1, 2, 3, 4 (a) Theory of Least Squares, 1, 2, 3 (b) Drawing, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (a) Metallurgy, 2, 3, 5 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3 (b)	2-5
3-4	*Physical Lab'y, 3 (a) *Organic Chemistry, 5 Drawing, 1, 2, 4 do 3 (b)	*Organic Chemistry, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3 do Chem. Lab'y, 2 Pen and Ink, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Chemical Lab'y, 1, 1 (b) Organic Chemistry, 5 Field Work, 1, 2, 4 (b) Drawing, 3 (b)	3-4
4-5	*Physical Lab'y, 3, 5 (a) Surveying 1, 2, 4 (a) (Lect.) 1, 2, 3, 4 (b) Drawing, 1, 2, 3, 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 Chem. Lab'y, 2	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Chemical Lab'y, 1, 4 (b) Field Work, 1, 2, 4 (a) Drawing, 3 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry ; \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are in common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drafting during the balance of the Session.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such intervals as suit the laboratory work.

## FACULTY OF THE SCHOOL.

## PRINCIPAL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.

## MEMBERS OF THE COUNCIL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.,  
Professor of Engineering (Chairman).

W. HODGSON ELLIS, M.A., M.B.,  
Professor of Applied Chemistry.

A. P. COLEMAN, M.A., Ph.D.,  
Professor of Assaying and Metallurgy.

L. B. STEWART, O.L.S., D.T.S.,  
Lecturer in Surveying (Secretary).

C. H. C. WRIGHT, B.A.Sc., M. Ont. Ass. Archts.  
Lecturer in Architecture.

T. R. ROSEBRUGH, M.A.,  
Lecturer in Electrical Engineering.

J. A. DUFF, B.A., A.M. Can. Soc. C. E.,  
Lecturer in Applied Mechanics.

G. R. MICKLE, B.A.,  
Lecturer in Mining.

A. T. LAING, B.A.Sc.,  
Demonstrator in Surveying.

J. W. BAIN, B.A.Sc.,  
Demonstrator in Analytical Chemistry.

## ASSISTANT INSTRUCTORS.

R. W. ANGUS, B.A.Sc.,  
Fellow in Mechanical Engineering.

A. H. HARKNESS, B.A.Sc.,  
Fellow in Civil Engineering.

## FACULTY.

### ASSISTANT INSTRUCTORS.—*Continued.*

D. A. WILLIAMSON, B.A.Sc.,  
Fellow in Electrical Engineering.

M. B. WEEKES, B.A.Sc.,  
Fellow in Mining Engineering.

A. H. ROBINSON, B.A.Sc.,  
Fellow in Chemistry.

### MEMBERS OF THE FACULTY of the University of Toronto whose classes are attended by the Regular Students of the School.

JAMES LOUDON, M.A., L.L.D.,  
President and Professor of Physics.

R. RAMSAY WRIGHT, M.A., B.Sc.,  
Professor of Biology.

ALFRED BAKER, M.A.,  
Professor of Mathematics.

A. B. MCCALLUM, B.A., M.B., Ph.D.,  
Professor of Physiology.

W. J. LOUDON, B.A.,  
Demonstrator in Physics.

C. A. CHANT, B.A.,  
Lecturer in Physics.

J. C. MCLENNAN, B.A.,  
Demonstrator in Physics.

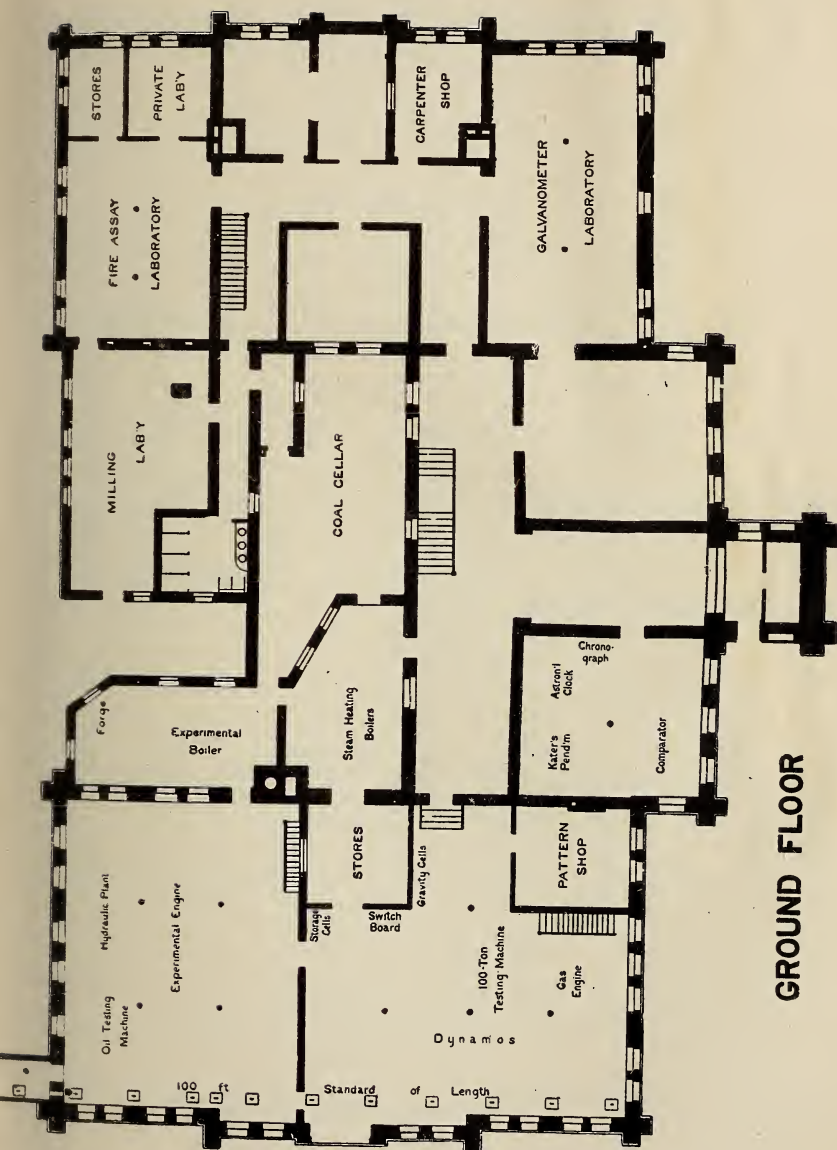
ALFRED T. DELURY, B.A.,  
Lecturer in Mathematics.

W. L. MILLER, B.A., Ph.D.,  
Demonstrator in Chemistry.

H. J. DAWSON, B.A.,  
Fellow in Mathematics.

For information further than that contained in the Calendar, application  
may be made to the Secretary, L. B. STEWART.

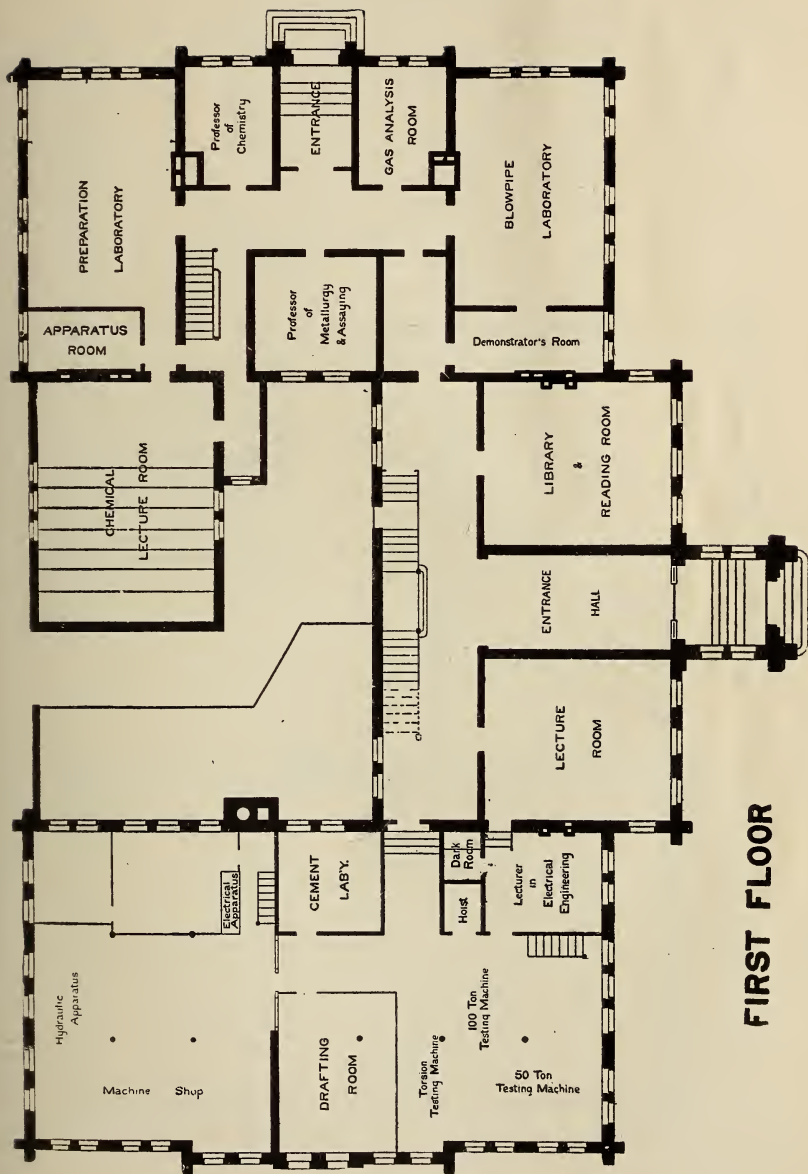




GROUND FLOOR

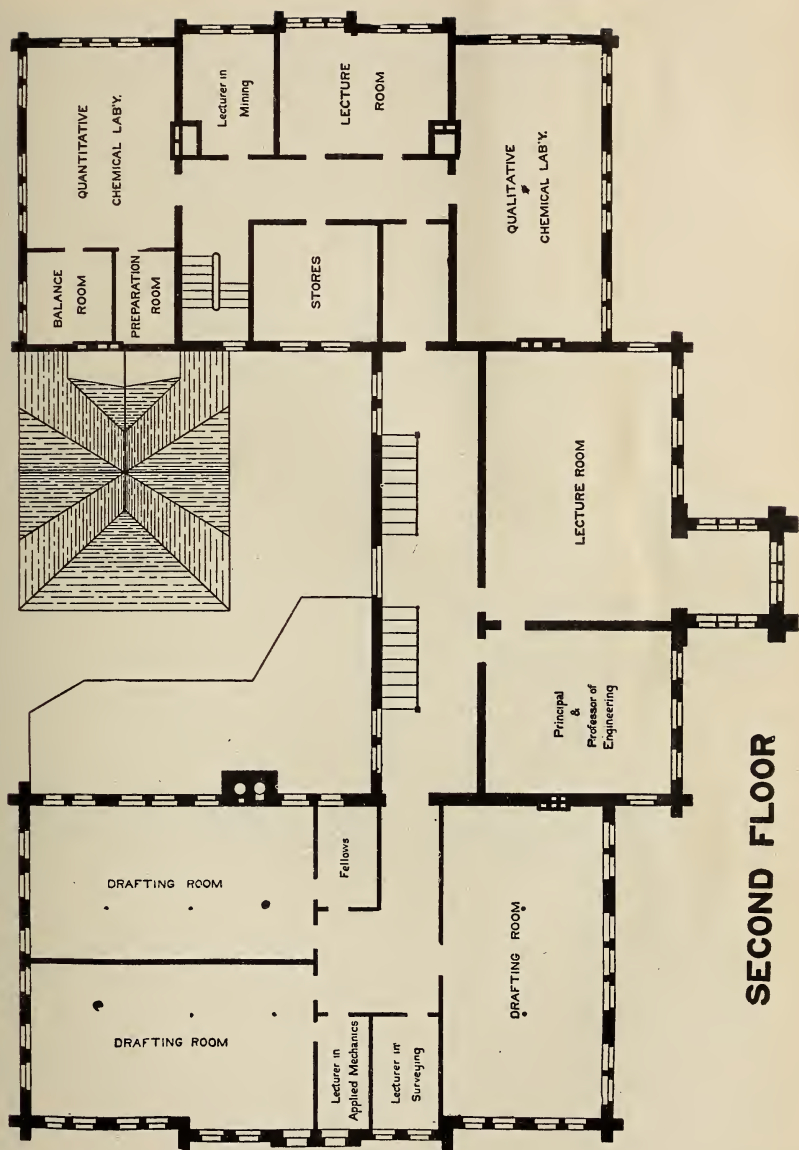






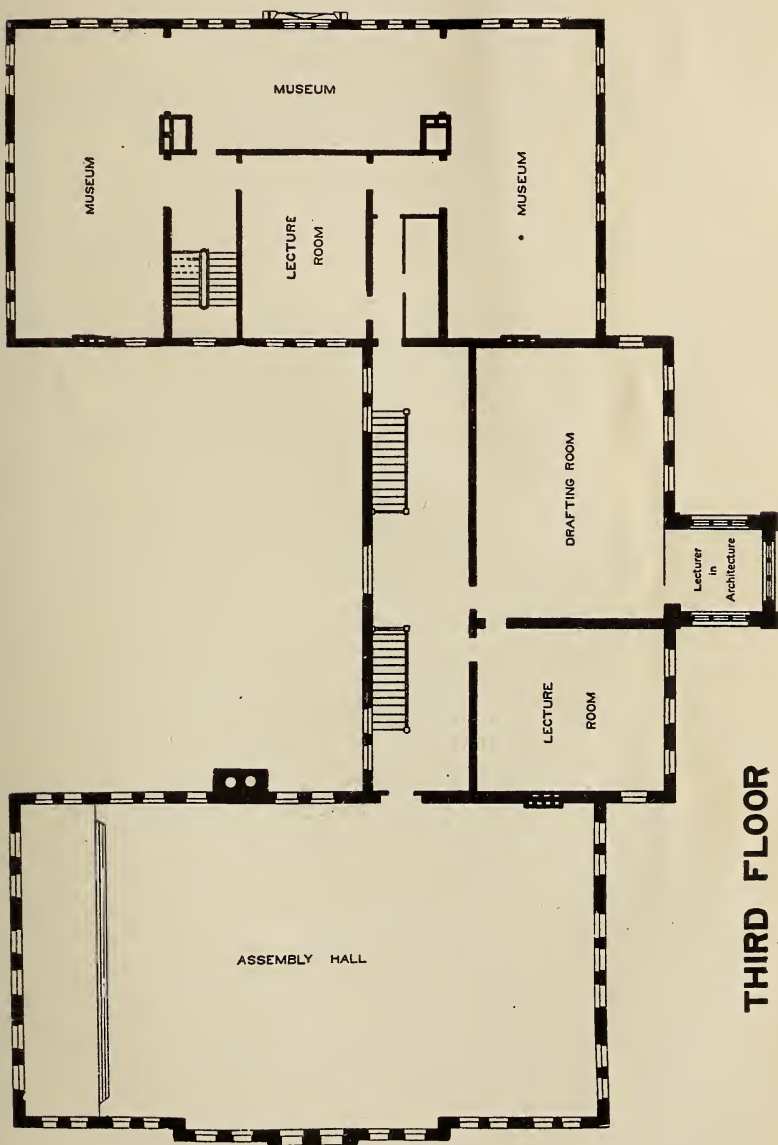
**FIRST FLOOR**





## SECOND FLOOR





## THIRD FLOOR





# SCHOOL OF PRACTICAL SCIENCE.

PROVINCE OF ONTARIO.

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CALENDAR FOR THE SESSION 1900-1901.

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THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments in science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was

entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz. :—

1. Civil Engineering (including Sanitary Engineering.)
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

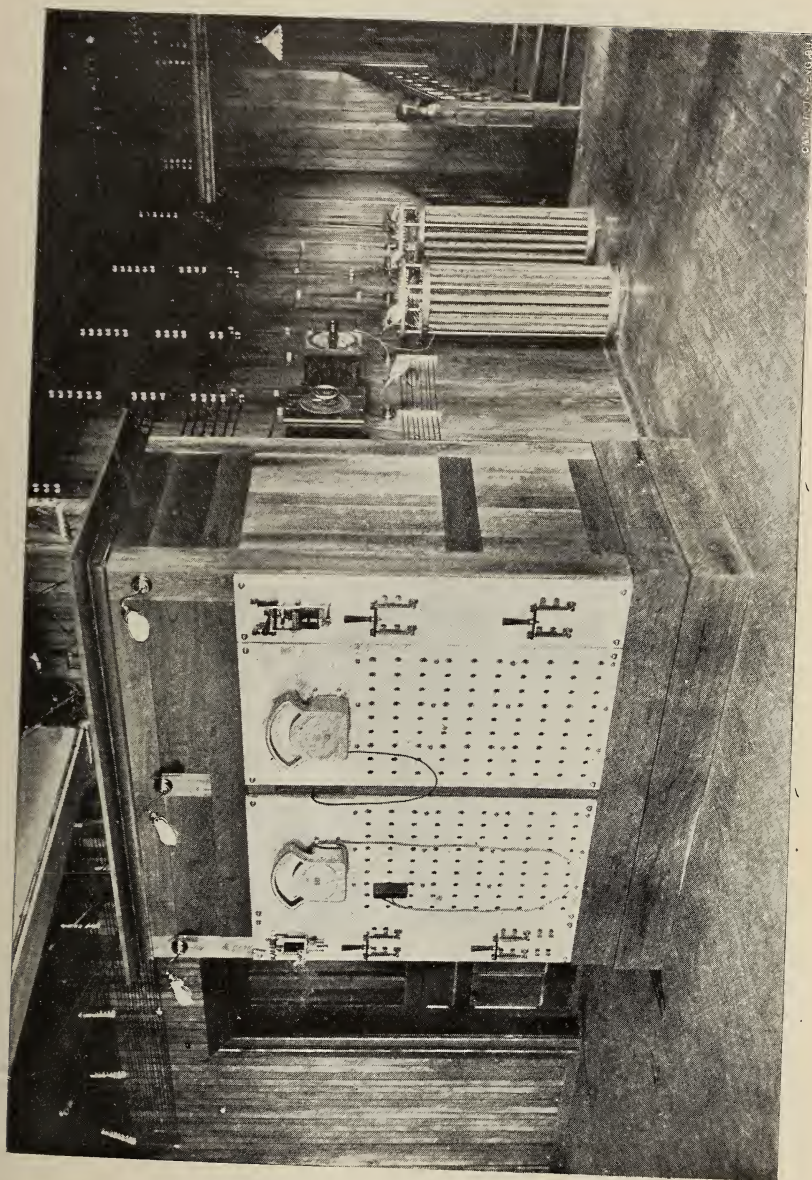
The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

### DIPLOMA.

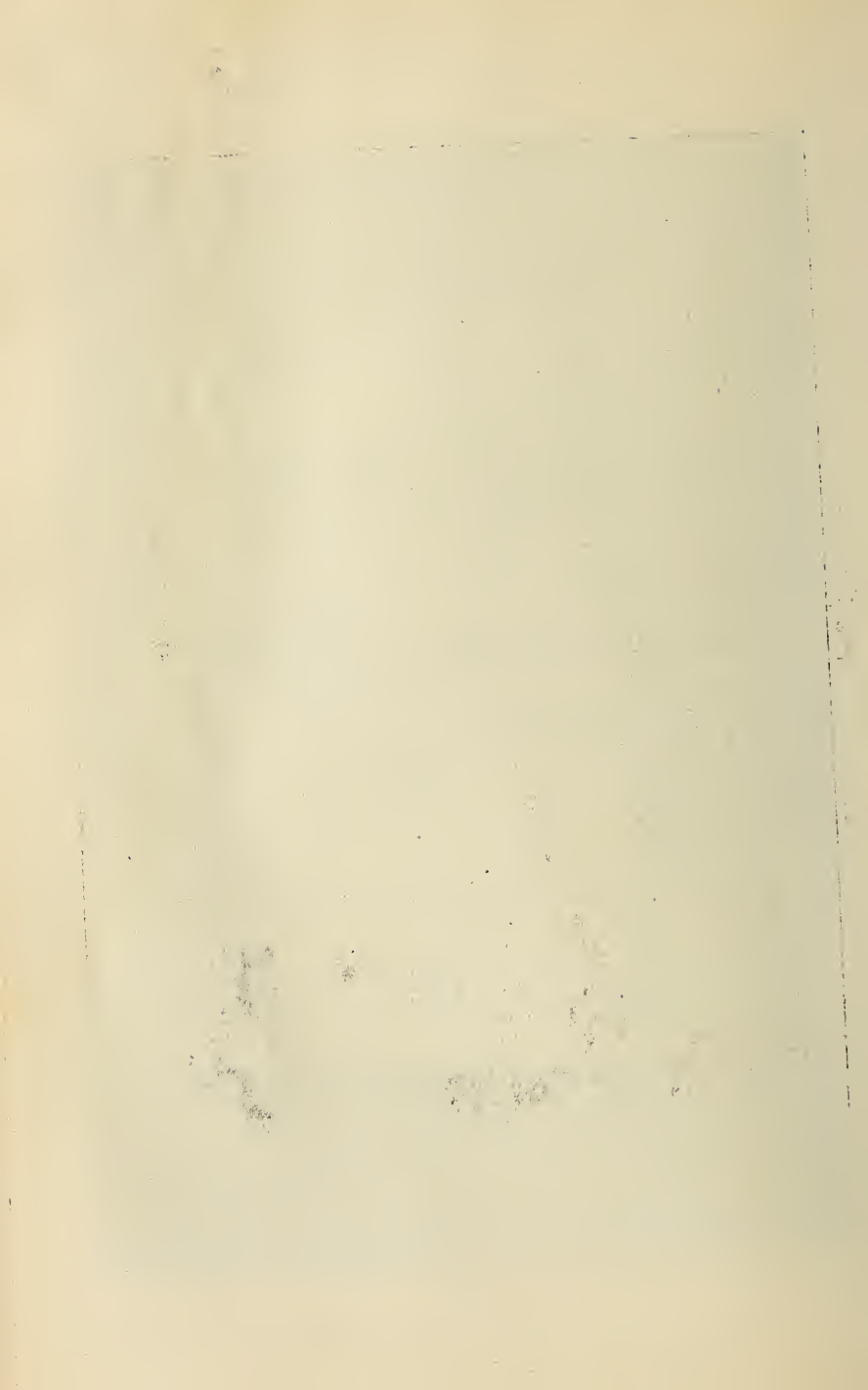
The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

### THE DEGREE OF B.A.Sc.

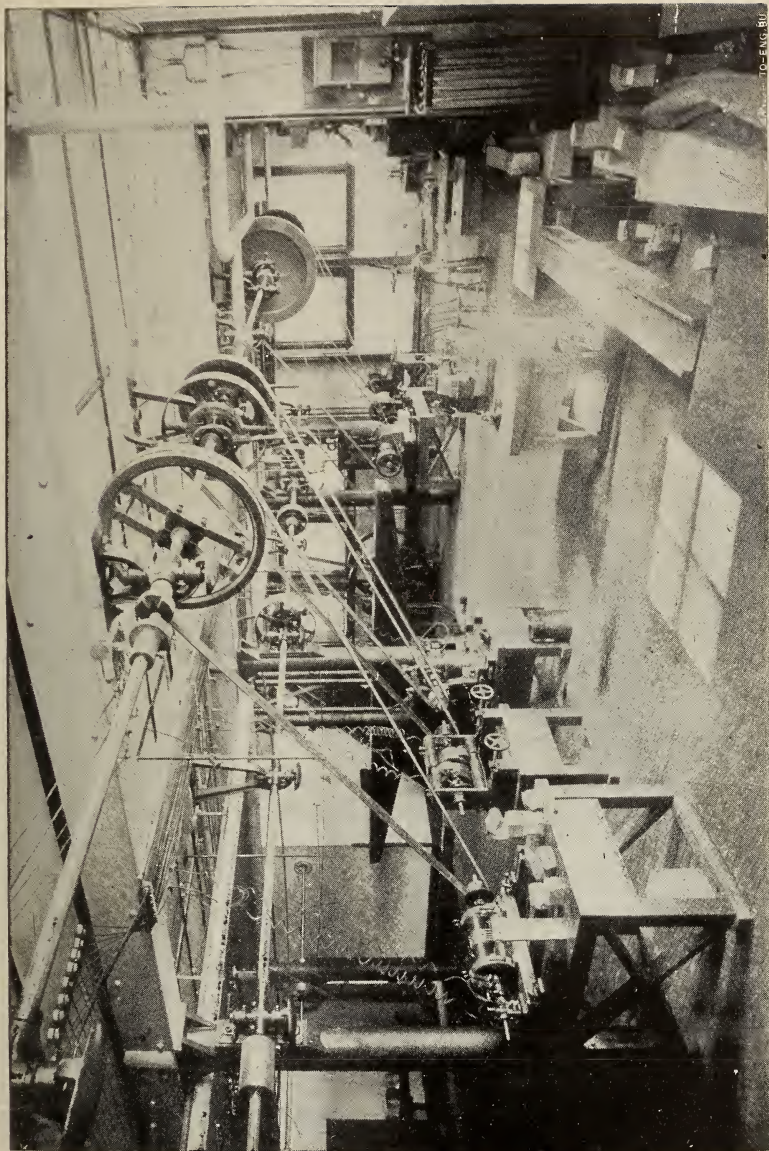
After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this



SWITCH-BOARD.







DYNAMO ROOM.





list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instructions is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a theses on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

#### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), or Electrical Engineer (E.E.), as the case may be, subject to the rules and regulations established by the University.

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# REGULATIONS

RESPECTING THE

## School of Practical Science,

Approved by Colonel Sir Casimir Stanislaus Gzowski, K. C. M. G.,  
Administrator of the Government of the Province of Ontario, the  
30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.
2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this vacation shall be determined annually by the Council.
3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :
  - (1) Civil Engineering (including Sanitary Engineering.)
  - (2) Mining Engineering.
  - (3) Mechanical and Electrical Engineering.
  - (4) Architecture.
  - (5). Analytical and Applied Chemistry.
4. The Regular Course for the Diploma of the School in each Department shall be three years.

5. Students may enter the Regular Course in any of the above Departments, either (a) by presenting certificates of having passed the Matriculation Examination in any University in Her Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (b) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects :

*Arithmetic.*—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

*Algebra.*—Elementary rules, easy factoring, highest common measure, lowest common multiple, square root, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

*Euclid.*—Books I., II, and III ; deductions.

*English.*—Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.
7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.
8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.

9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.
10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.

#### ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, p. 32.

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (*b*) order in Council, p. 32.

This examination will begin at 9 a.m., Thursday, September 27th, 1900.

Candidates are required to give the Secretary at least two weeks' notice in writing of their intention to take this examination.



*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School, all the requirements  
thereunto relating.*

*In witness whereof, we have signed this Diploma, at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred and \_\_\_\_\_  
and have caused the seal of this School to be hereunto affixed.*

*Chairman.*

*Secretary*







INTER-COLLEGE ATHLETIC TROPHIES.



## REGULAR COURSES FOR THE DIPLOMA.

See regulations pp. 42 and 43.

The following are the Departments in which the Diploma is granted :--

- (1) Civil Engineering (including Sanitary Engineering).
- (2) Mining Engineering.
- (3) Mechanical and Electrical Engineering.
- (4) Architecture.
- (5) Analytical and Applied Chemistry.

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

YEAR	DESCRIPTION OF PAYMENT	1.	2.	3.	4.	5.
		Civil Engineering	Mining Engineering.	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
I.	Payable in First Term—					
	Sessional Fees . . . . .	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Physical Laboratory . . . . .			1 00		1 00
	Library . . . . .	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General . . . . .	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory . . . . .	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory . . . . .					
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees . . . . .	35 00	35 00	35 00	35 00	35 00
	Total . . . . .	75 00	75 00	76 00	75 00	76 00

YEAR	DESCRIPTION OF PAYMENT	1.	2.	3.	4.	5.
		Civil Engineering.	Mining Engineering.	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
II.	Payable in First Term—	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
	Sessional Fees. ....	39 00	39 00	39 00	39 00	39 00
	Dues—					
	Physical Laboratory....	1 50	1 50	1 50	1 00	1 50
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General . . . . .	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 50	49 50	46 50	46 00	49 50
	Payable in Second Term—					
	Sessional Fees . . . . .	40 00	40 00	40 00	40 00	40 00
	Total . . . . .	89 50	89 50	86 50	86 00	89 50
III.	Payable in First Term—					
	Sessional Fees . . . . .	44 00	44 00	44 00	44 00	44 00
	Dues—					
	Physical Laboratory....	1 00	.....	3 00	2 00	3 00
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General . . . . .	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	.....	3 00	.....	.....	3 00
	Mineralogical Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	50 00	49 00	56 00
	Payable in Second Term—					
	Sessional Fees . . . . .	45 00	45 00	45 00	45 00	45 00
	Total . . . . .	93 00	98 00	95 00	94 00	101 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows :

Payable in First Term—	
Sessional Fees .....	\$35 00
Dues, Library .....	1 00
Deposits, General .....	2 00
Payable in Second Term—	
Sessional Fees .....	34 00
University Fees .....	20 00
<hr/>	
Total.....	\$92 00

Fourth year students must also pay the deposits of the laboratories in which they work.

OCCASIONAL STUDENTS.—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library due, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

CERTIFICATES.—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Analytical and Applied Chemistry.

Each fellowship is of the value of \$500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September.

### REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in October, notice in writing of their intention to take such examinations.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in Drawing the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.



The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserve the right of disposing of the drawing as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

#### **Vacation Work.**

Vacation work must be handed in on or before October 1st, 1900.

Vacation notes must be on construction only, and contain not fewer than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not fewer than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for the theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

#### **Supplemental Examinations, Etc.**

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject, he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the first day of the session. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or thesis indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time table.

#### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, unless under such exceptional circumstances as may be deemed sufficient by the Council, which must be fully set forth in a formal petition.

#### PRIZE.

The following prize has been established ;

Civil Engineering, 3rd Year, \$10 in books. Donor—  
Mr. T. Kennard Thomson, C.E., New York.

#### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS.

(APPROXIMATE LIST.)

## I Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Statics.
Euclid.	Dynamics.
Plane Trigonometry.	Descriptive Geometry.
Analytical Geometry 1, 2, 3, 4.	Surveying . . . . . 1, 2, 3, 4
History of Architecture. . . . 4.	Chemistry, Elementary.
Magnetism and Electric- ity . . . . . 3, 5.	Electricity . . . . . 3, 5.
	Heat.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes . . . . . 1, 2, 4.
Architectural Sketches . . . . 4.
Experimental Physics . . . . 3, 5.
Electricity, Practical . . . . 3, 5.
Practical Chemistry.
Practical Mineralogy . . . 1, 2, 5.
French and German . . . . . 5.

## II Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus . . . . . 1, 2, 3, 4.	Strength of Materials. 1, 2, 3, 4
Astronomy . . . . . 1.	Rigid Dynamics. . . . 1, 2, 3.
Optics.	Theory of Mechanism . . . 3.
Hydrostatics.	Descriptive Geometry . . . .
History of Architecture. . . 4.	. . . . . 1, 2, 3, 4.
Orders of Architecture . . . 4.	Surveying . . . . . 1, 2, 4.

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|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

History of Ornament . . . . 4.	Spherical Trigonometry . . . .
Chemistry, Inorganic and . . . . . 1, 2, 3.	
Physical . . . . . 5.	Mineralogy and Geology . . .
Chemistry, Applied. . . . . 1, 2, 4, 5.	
Electricity . . . . . 3, 5.	Lithology . . . . . 2.
	Metallurgy.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing . . . . . 1, 2, 3, 4.
Field Notes . . . . . 1, 2.
Construction Notes . . . . . 1, 2, 3, 4.
Architectural Sketches . . . . . 4.
Experimental Physics.
Electricity, Practical . . . . . 3.
Thesis (at begining of session.)
Chemistry, Practical.
Mineralogy, Practical . . . . . 1, 2, 5.
French and German . . . . . 5.

## III Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity . 3.	Theory of Construction . . . .
History of Architecture. . . 4.	. . . . . 1, 2, 3, 4.
History of Ornament. . . . 4.	Mechanics of Machinery . . 3.
Principles of Decoration . . 4.	Machine Design . . . . . 3.
Elements of Design . . . . 4.	Hydraulics . . . . . 1, 2, 3, 4.
Method of Least Squares . . .	Thermodynamics . . . . 1, 2, 3.
. . . . . 1, 2, 3.	Descriptive Geometry . . . .
Chemistry, Inorganic and . . . . . 1, 2, 3, 4.	
Organic . . . . . 5.	Practical Astronomy and
Chemistry, Applied.	Geodesy . . . . . 1.
Mineralogy and Geology	Surveying and Levelling
. . . . . 1, 2, 4, 5.	. . . . . 1, 2.

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|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

Sanitary Plumbing, Heating and Ventilation	4.	Metallurgy	.....2, 3, 5.
Theory of Compound Stress	.....1, 3, 4.	Mining and Ore Dressing	...2.
		Ore Deposits	.....2.
		Assaying	.....2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing	.....1, 2, 3, 4.
Field Notes	.....1, 2.
Construction Notes	.....1, 2, 3, 4.
Architectural Sketches	.....4.
Experimental Physics	....1, 3, 4, 5.
Electricity, Practical	.....3.
Thesis (at beginning of session.)	
Chemistry, Practical	.....2, 5.
Mineralogy, Determinative	....2, 5.
Assaying	.....2, 5.

## DEPARTMENT OF CIVIL ENGINEERING.

(INCLUDING SANITARY ENGINEERING.)

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers (including under this term Sanitary Engineers).

## I Year.

## MATHEMATICS.

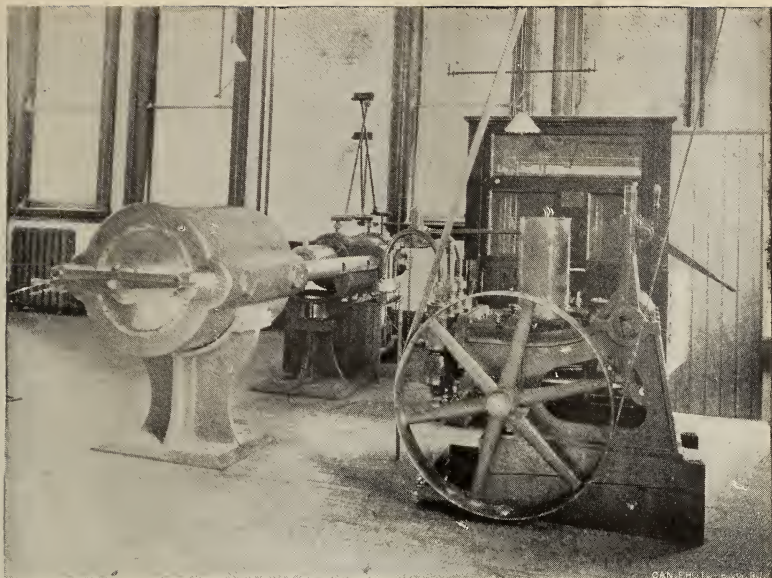
Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

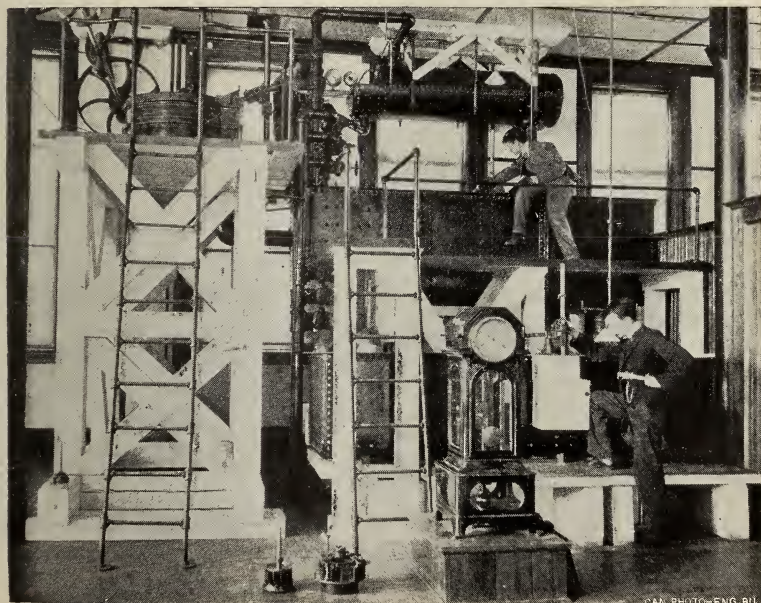
Copying from the flat, lettering, topography.  
Graphics.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering,                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |



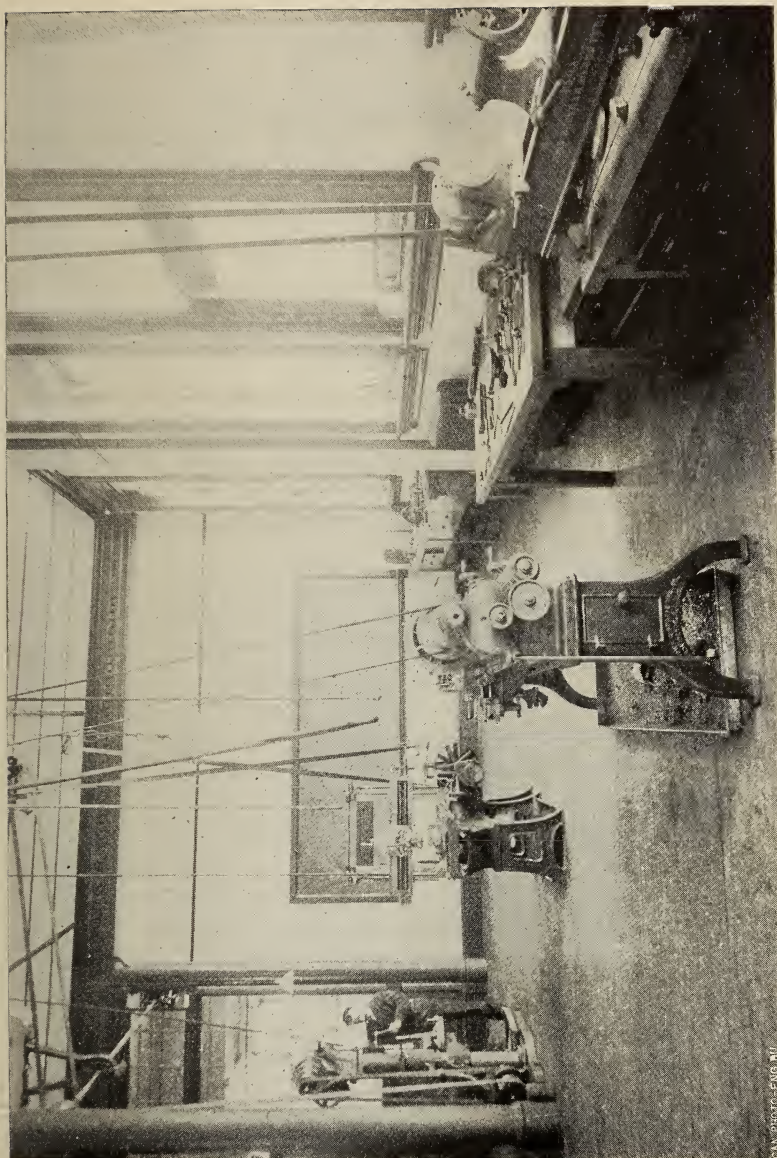


EMERY TESTING MACHINE.



HYDRAULIC PLANT.





MACHINE SHOP.





Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Elementary Chemistry.

Laboratory practice.

MINERALOGY.

Introductory course.

PHYSICS.

Heat.

MECHANICS.

Statics and dynamics (with special reference to structures and machines).

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus,

Spherical trigonometry.

Plane astronomy.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes).

## CHEMISTRY.

Advanced Chemistry  
Thermo-chemistry.  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)  
Strength and elasticity of materials.  
Experimental work in engineering laboratory.  
Transit-theodolite surveying.  
Levelling.  
Railway location curves, etc.  
Hydrographic surveying.

## MINERALOGY AND GEOLOGY.

Elements of these sciences.  
Blowpipe practice.  
Determination of minerals.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.  
Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 43 and 101.

**III. Year.**

## DRAWING.

Subjects of previous years continued.  
Descriptive geometry — shades and shadows,  
stone cutting, perspective projection.  
Original designs—bridges, roofs, floors, arches,  
etc.



## CHEMISTRY (Applied).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).  
Strength and elasticity of materials.  
Theory of construction.  
Practical designs—bridges, roofs, floors, arches,  
retaining walls, foundations, etc.  
Thermodynamics and theory of the steam engine.  
Hydraulics, sewerage, water supply.  
Experimental work in engineering laboratory.  
Levelling.  
Profiles, cross sections, field work and plotting.  
Computation of quantities.  
Mathematical theory of surveying instruments.  
Trigonometrical and barometrical levelling.  
Geodesy (considering the earth a sphere).  
Practical astronomy (treated in the manner  
required for the O.L.S. and D.L.S. examina-  
tions).  
Least squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages 43 and 101.

**II. DEPARTMENT OF MINING ENGINEERING.**

This department is designed to afford the necessary preliminary training to students intending to become mining engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.  
Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.  
Original surveys.

## CHEMISTRY.

General principles of chemistry.  
Elementary Chemistry.  
Laboratory practice.

## MINERALOGY.

Introductory course.

## PHYSICS.

Heat.

## MECHANICS.

Statics and dynamics, (with special reference to structures and machines).

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.  
Spherical trigonometry.

## DRAWING.

Subjects of first year continued.  
Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures from both copies and original notes.

CHEMISTRY.

Advanced Chemistry

Thermo-chemistry.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location, curves, etc.

Mining surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

Lithology.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages 43 and 101.

## III. Year.

## DRAWING.

Subject of previous years continued.

Descriptive geometry,

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

Laboratory practice.

Wet assays.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Thermodynamics and theory of steam engine.

Hydraulics.

Experimental work in engineering laboratory.

Levelling.

Profiles, cross-sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.

Least squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

Palæontology.

Ore deposits.

Blowpipe analysis and determinative mineralogy

Metallurgy of gold, silver, nickel, copper, etc.

Mining and ore dressing.

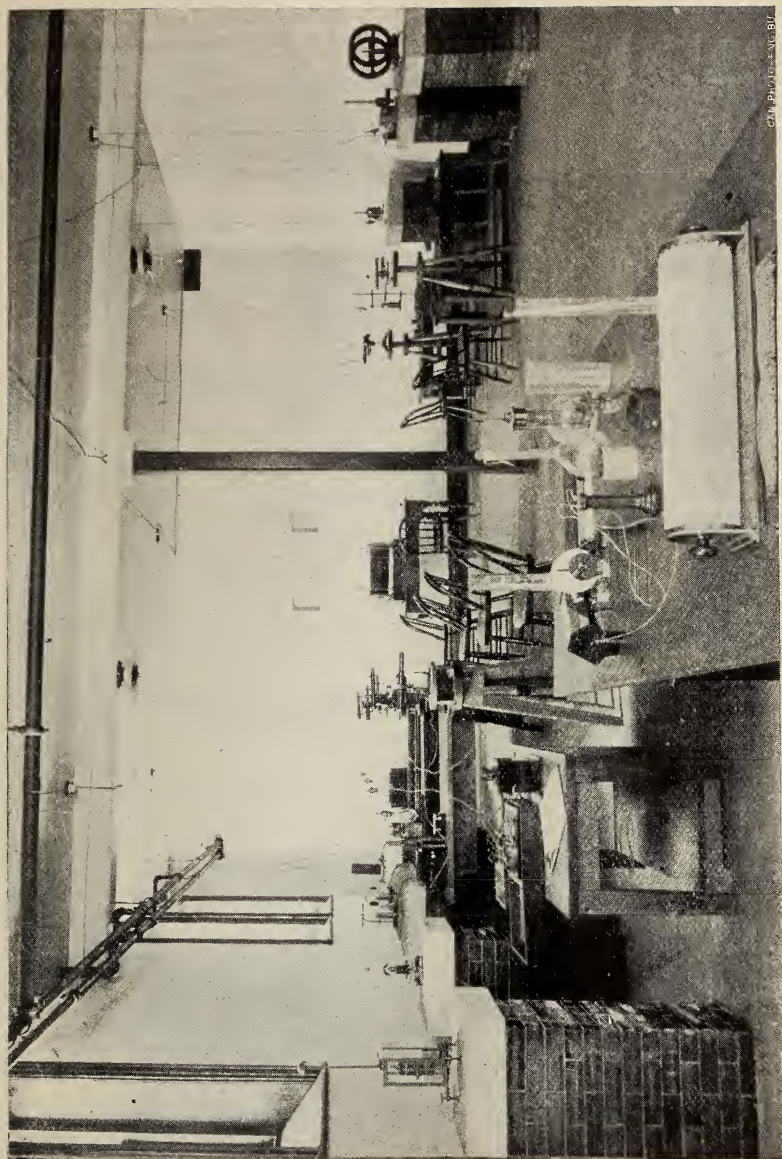
Assaying.



CLOCK ROOM.







CH. PROGRESSIVE BUL

GALVANOMETER LABORATORY.



## VACATION WORK.

See pages 43 and 101.

## III. DEPARTMENT OF MECHANICAL AND ELECTRICAL ENGINEERING.

This department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, graphics.

Descriptive geometry in its application to plane-sided solids, orthographical (including isometrical) and oblique projection.

## CHEMISTRY.

General principles of chemistry.

Elementary Chemistry.

Laboratory practice.

## MECHANICS.

Statics and dynamics (with special reference to structures and machines).

## SURVEYING.

(Lectures only). Application of trigonometry and principles of measurement.

## PHYSICS.

Heat.

Magnetism and electricity (introductory course).

Electricity (applications of the laws of Ohm, Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course.

## EXPERIMENTAL PHYSICS.

Introductory course.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere.

Machines and structures. (Drawings made from both copies and original notes).

## CHEMISTRY.

Advanced Chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

Strength and elasticity of materials.

Materials and construction.

Methods and processes.

Experimental work in engineering laboratory.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

Electrical measurements.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 43 and 101.

### III. Year.

DRAWING.

Subjects of previous year continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective  
projection

CHEMISTRY (APPLIED).

Explosives

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

ENGINEERING.

Subjects of previous year continued.

Applied mechanics :

Mechanics of machinery, machine design,  
thermodynamics and theory of the  
steam engine, hydraulics.

Electricity.

Dynamos and motors.

Application of principles to practical problems  
connected with the design, construction and  
testing of various prime motors and machines.

Experimental work in engineering laboratory.

Least squares.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

## ELECTRICAL LABORATORY.

## ORIGINAL DESIGNS.

Engine and machine design.

## VACATION WORK.

See pages 43 and 101.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

## IV. DEPARTMENT OF ARCHITECTURE.

This department is designed to afford the necessary preliminary training to students intending to become Architects.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography,  
graphics.

Descriptive geometry in its application to plane  
sided solids, orthographic (including isometric) and oblique projection.

Rendering in pencil and pen and ink.



CHEMISTRY.

General principles of chemistry.

Elementary Chemistry.

Laboratory practice.

PHYSICS.

Heat.

MECHANICS.

Statics (with reference to structures).

Dynamics (preliminary to the study of hydraulics).

SURVEYING.

Principles, chain surveying, mensuration.

HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.

II. Year.

MATHEMATICS.

Differential and integral calculus.

DRAWING.

Instrumental drawing, drawing from the cast  
sketching and water color, pen and ink.

Descriptive geometry (curved surfaces).

CHEMISTRY.

Advanced Chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

MECHANICS.

Statics (pure and applied).

Strength and elasticity of materials.

Materials of construction.

Experimental work in engineering laboratory.

## SURVEYING.

Use of transit and level.

Mensuration.

## MINERALOGY AND GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## HISTORY OF ARCHITECTURE.

Greek and Roman.

Romanesque and Byzantine.

## ORDERS AND ELEMENTS OF ARCHITECTURE.

## HISTORY OF ORNAMENT.

Ancient.

Classic—Greek, Roman.

## VACATION WORK.

See pages 43 and 101.

## III. Year.

## DRAWING.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Water color sketching.

Original designs—floors, trusses, arches, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

## THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

## HYDRAULICS.

## SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

## SURVEYING.

Levelling, setting out excavation, mensuration.

## MINERALOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat, acoustics.

## HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

## ELEMENTS OF DESIGN.

Principles of Planning with special reference to residences.

Relation between plan and elevations.

## HISTORY OF ORNAMENT.

Early Christian ; Gothic and Renaissance.

## PRINCIPLES OF DECORATION.

## VACATION WORK.

See pages 43 and 101.

## V. DEPARTMENT OF ANALYTICAL AND APPLIED CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

### I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

- Copying from the flat, lettering.
- Descriptive geometry in its application to plane sided solids.
- Orthographic (including isometric) and oblique projection.
- Model drawing.

## CHEMISTRY.

- General principles of chemistry.
- Elementary Chemistry.
- Laboratory practice.

## MINERALOGY.

- Introductory course.

## MECHANICS.

- Statics and dynamics.

## PHYSICS.

- Heat.
- Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

- Introductory course.

## PRACTICAL ELECTRICITY.

- Introductory course.

## MODERN LANGUAGES.

- French.
- German.

## II. YEAR.

## CHEMISTRY.

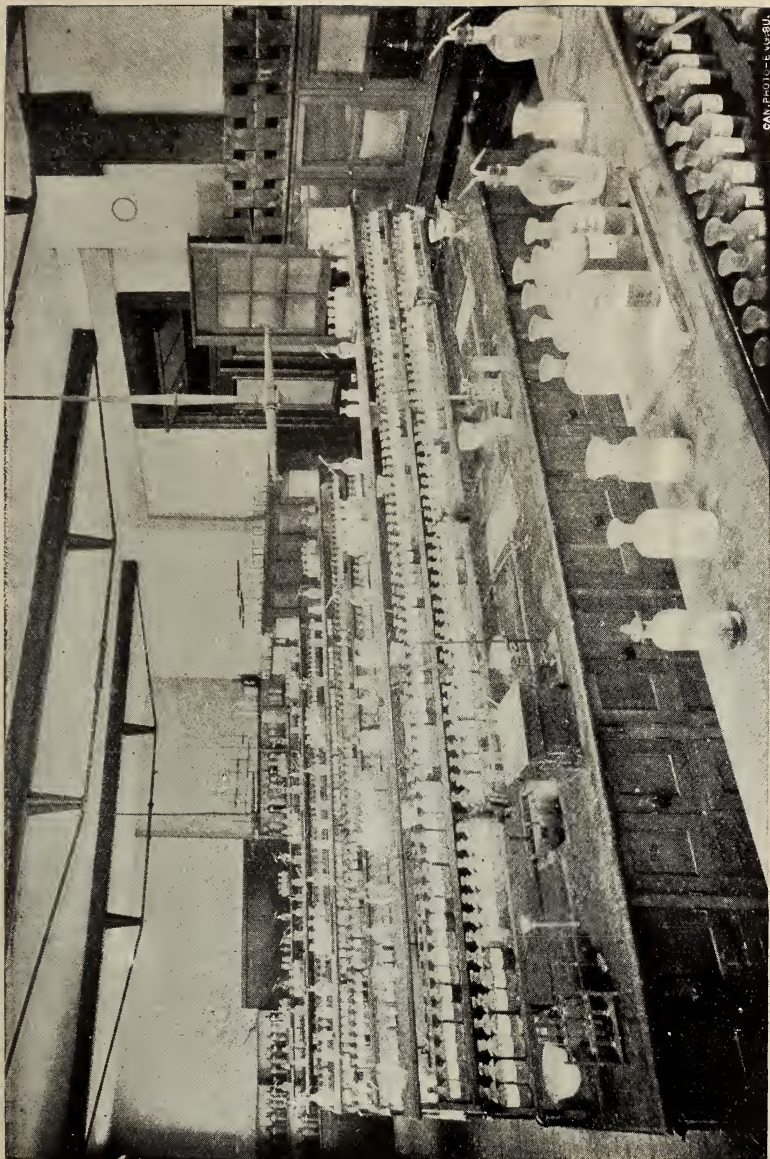
- Inorganic and physical chemistry.
- Applied chemistry.
- Laboratory work in quantitative and qualitative analysis.

## MINERALOGY AND GEOLOGY.

- Elementary mineralogy and blowpipe practice.
- \*Physical geography, palæontology and geology.

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\* An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.



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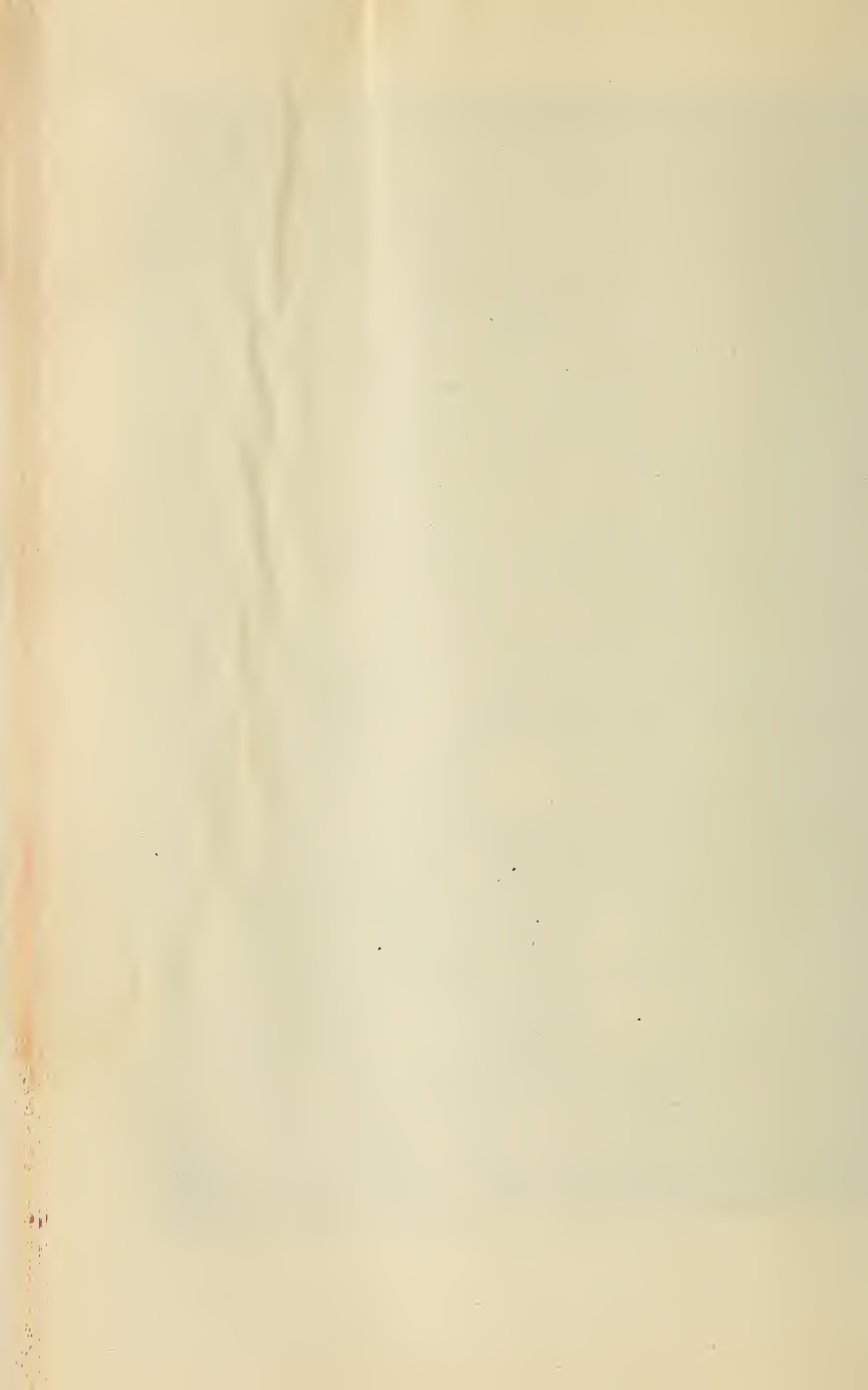
CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.







CHEMICAL LABORATORY—QUANTITATIVE ANALYSIS,



METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

Electricity.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

MODERN LANGUAGES.

Students in this and the following years are expected to be able to read chemical books in French and German.

VACATION WORK.

See pages 43 and 101.

III. Year.

CHEMISTRY.

Organic chemistry and chemical physics.

Applied chemistry.

Laboratory work.

MINERALOGY AND GEOLOGY.

† Economic geology.

Blowpipe analysis and determinative mineralogy.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

BIOLOGY.

VACATION WORK.

See pages 43 and 101.

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† An option is permitted between above subject and Physical Chemistry in the University of Toronto.

## THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of optional and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will

not be allowed to take less than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year..... 900

Subdivided as follows :—

Work (reckoned in hours). . . . . 540 marks

Records (notes, drawings, etc.)..... 360 marks

#### FOR PASS.

The minimum percentages are :

Work, 75 per cent..... 405 marks

Records, 50 per cent..... 180 "

And two-thirds of the total marks assigned 600 "



## FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statute of the University of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they effect the degree of B. A. Sc.

## DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations :



## *SCHOOL OF PRACTICAL SCIENCE.*

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.
3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.
4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.
  - A. { Astronomy.  
Geodesy and Metrology.
  - B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
  - C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry  
Inorganic and Organic Chemistry.

- B. { Mineralogy and Geology.  
 { Metallurgy and Assaying.

The sub-division "Inorganic and Organic Chemistry" will be obligatory on all candidates who select group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent., of the marks assigned, will be required.

The degree with honors will be conferred on candidates who obtain three out of the four honors possible, viz.:

Certificate with honors . . . . . (cl. 2.)

Thesis with honors . . . . . (cl. 3.)

Honors in each subject of examination. (cl. 4.)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in April.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of May.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

## SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto,

*Be it enacted:*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degrees be hereby established, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.).
- III. That the following be the conditions and regulations governing the conferring of the said degrees.
  1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause II hereunder.
  2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree.
  3. Intervals of non-employment or of employment in other branches of engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
  4. Satisfactory evidence shall be submitted to the University Examiners as to the nature and length of the candidate's professional experience for the purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidate may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the fifteenth day of April.
8. The candidate shall be required to present himself for examination in the month of April at such time as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the University.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science. For further particulars apply to the Registrar of the University of Toronto.

## DOMINION AND ONTARIO LAND SURVEYORS.

Courses of instruction will be given in accordance with the requirements of the Statutes relating to the Dominion and Ontario Land Surveyors, which will enable the graduates to present themselves for final examination before the proper boards, at an earlier period in their apprenticeship than would otherwise be permitted.

**Extract from the Provincial Act respecting Land Surveyors and Survey of Lands. (R.S.O.)**

“ 10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practising Ontario Land Surveyor.”

“ 14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practising land surveyor duly filed as required by section 17 of this Act,

during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practising Ontario Land Surveyor."

**Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions; for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."



The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.

**Extract from the Ontario Architects' Act.**

“ Any student who has matriculated in Arts in any University in Her Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

“ 23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

“ 24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

“(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture, to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Register upon payment of such fees as the council may by regulation direct.”

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## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

Text-books for the first year marked (*a*) ; second year (*b*) ; third year (*c*) and for fourth or post graduate year (*d*).

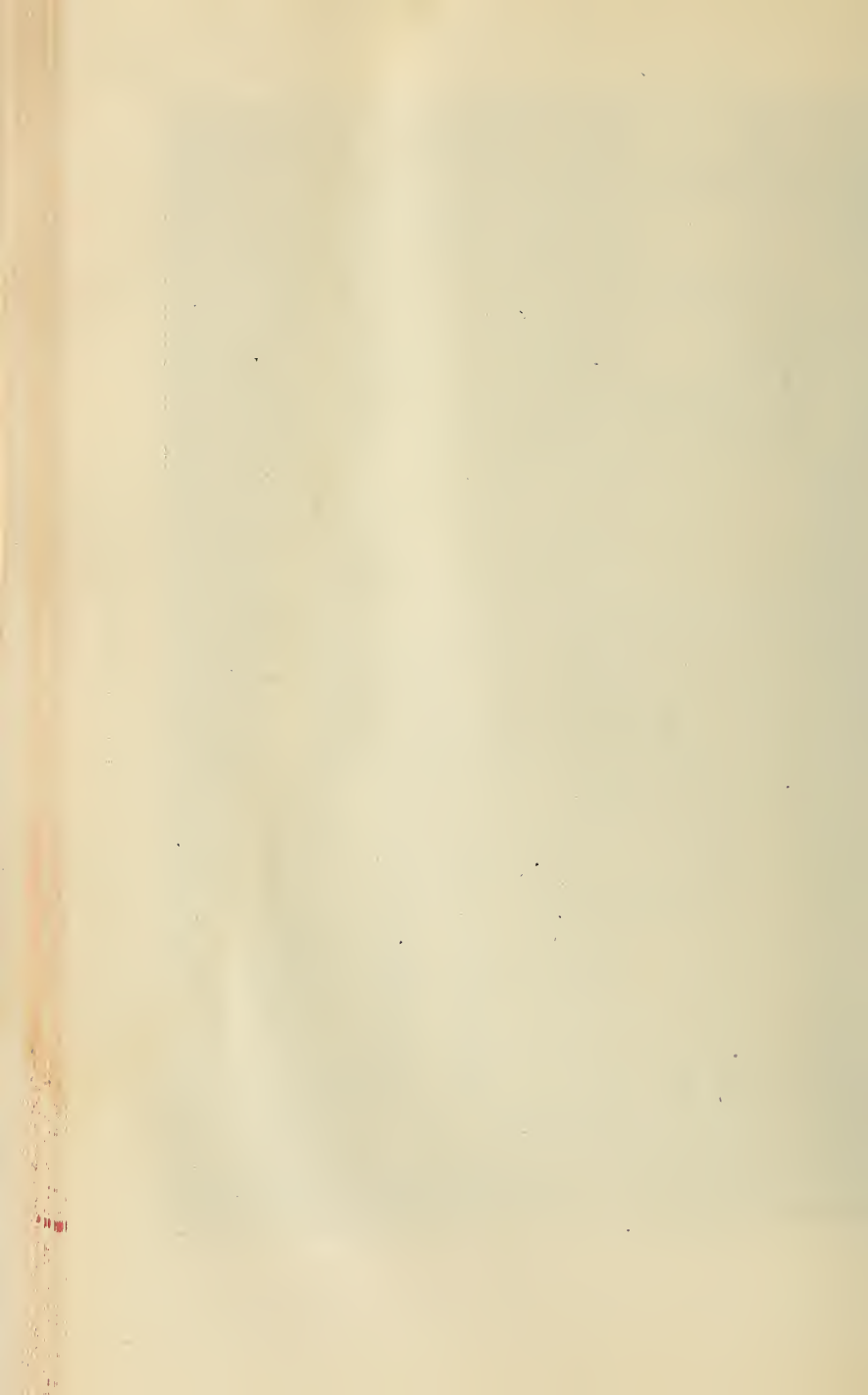
### SUBJECTS TAUGHT BY THE FACULTY OF THE SCHOOL.

Subjects.	Instructors.
Organic and Inorganic Chemistry, Applied Chemistry, Assaying	W. H. Ellis, M.A., M.B., Professor. J. W. Bain, B.A.Sc., Demonstrator. A. H. A. Robinson, B.A.Sc., Fellow.
Mineralogy and Geology, Petrography, Metallurgy, Mining and Ore-dressing, Milling, German,	A. P. Coleman, M.A., Ph., D., Professor. G. R. Mickle, B.A., Lecturer. M. B. Weekes, B.A.Sc., Fellow.
Statics, Dynamics, Strength of Materials, Theory of Construction, Machine Design, Compound Stress, Hydraulics, Thermodynamics and theory of the Steam Engine, French,	J. Galbraith, M.A., Professor. J. A. Duff, B.A., Lecturer. R. W. Angus, B.A.Sc., Fellow.
Drawing, Architecture, Plumbing, Heating and Ventilation, Mortars and Cements, Brick and Stone Masonry,	C. H. C. Wright, B.A.Sc., Lecturer. A. H. Harkness, B.A.Sc., Fellow.
Surveying, Geodesy and Astronomy, Spherical Trigonometry, Least Squares, Descriptive Geometry,	L. B. Stewart, D.T.S., Lecturer. A. T. Laing, B.A.Sc., Demonstrator.
Electricity, Magnetism, Dynamo-Electric Machinery, Theory of Mechanism, Mechanics of Machinery, Rigid Dynamics,	T. R. Rosebrugh, M.A., Lecturer. D. A. Williamson, B.A.Sc., Fellow.



RAY PHOTO-ENG. CO.

BLOWPIPE LABORATORY.







MINERALOGICAL COLLECTION.





## Subjects Taught by the Faculty of the University.

Subjects.	Instructions.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy.	<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">}</div> <div>           Alfred Baker, M.A., Professor.            A. T. DeLury, B.A., Lecturer.            H. J. Lawson, B.A., Fellow.         </div> </div>
Sound, Light, Heat, Electricity and Magnetism, Hydrostatics.	<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">}</div> <div>           Jas. Loudon, M.A., LL.D.,  <div style="text-align: right;">Professor.</div>           W. J. Loudon, B.A.,  <div style="text-align: right;">Demonstrator</div>           C. A. Chant, B.A., Lecturer.            J. C. McLennan, B.A.,  <div style="text-align: right;">Demonstrator.</div> </div> </div>

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

## Text Books and Books of Reference.

Angel—Plane and Solid Geometry.

Binn—Orthographic projection.

Church—Descriptive Geometry (*a*), (*b*).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*).

Vere Foster—Copy Book No. 10 (*a*).

Warren—Stone Cutting (*c*).

Worthen—Topographical Drawing.

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

Chain surveys.

Compass and theodolite surveys.

Method of keeping field notes.

Determination of heights and distances.

Plotting.

## LEVELLING.

Longitudinal and cross sections.

Plotting.

## SETTING OUT.

Setting out straight lines and curves.

Setting out levels.

## MENSURATION.

Lines, surfaces and solids.

Timber, masonry, iron and earthwork.

Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

## Text-Books.

Brough—Mine Surveying (*b*) (*c*).

Gillespie Higher Surveying (*b*), (*c*), (*d*).

Henck or Searle—Railway Curves (*b*), (*c*).

Johnson—Theory and Practice of Surveying.

Murray—Manual of Land Surveying (*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

## ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map constructions are based upon the supposition that the earth is a sphere.

#### ADVANCE COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors. It is distinguished from the work of the ordinary course not so much by the subjects as by the degrees of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

#### Text-Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher surveying (*b*), (*c*), (*d*).

Gore—Elements of Geodesy (*c*), (*d*).

Green—Spherical and Practical Astronomy (*c*), (*d*).

Helmert—Hohere Geodesie.

Nautical Almanac, 1901 (*c*), (*d*).

#### APPLIED MECHANICS.

##### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry -  
arches, retaining walls, roofs, bridges, etc.

DYNAMICS.

Representation and measurement of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc. etc.

STRENGTH OF THE PARTS OF MACHINES.

MACHINE DESIGN—

HYDRAULICS.

Discharge of water through orifices, notches, etc.

Flow in pipes, and open channels. Sewerage,  
water-works, water-power, water-wheels  
turbines, pumps, etc.

THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

#### Text-Books and Books of Reference.

Baker—Masonry Construction (*d*).

Billings—Heating and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc-, (*d*).

Carnegie—Pocket Companion,

Carpenter—Heating and Ventilation of Buildings (*c*)

“ Experimental Engineering (*d*).

Du Bois—Graphic Statics.

“ Strains in framed Structures.

Gerhard—House Drainage and Sanitary Plumbing (*c*).

Greene—Trusses and Arches.

Innes—Centrifugal pumps, Turbines and Water Motors (*d*).

\* Johnson—Modern Framed Structures (*c*), (*d*).

“ Materials of Construction (*d*).

Kennedy—Mechanics of Machinery (*b*), (*c*).

Kidder—Building Construction and Superintendence.

“ Architect and Builders' Pocket Book.

Lanza—Applied Mechanics.

Low and Bevis—Machine Drawing and Design (*b*), (*c*).

Low—Machine Drawing (*a*), (*b*), (*c*).

Merriman and Jacoby—Roofs and Bridges.

Merriman—Mechanics of Materials (*b*), (*c*), (*d*).

“ Hydraulics (*c*), (*d*).

Patton—Foundations (*d*).

Peabody—Thermodynamics (*d*).

“ Steam Tables (*d*).

Rafter and Baker—Sewage Disposal in the United States.

Rankine—Applied Mechanics (*c*), (*d*).

Reuleaux—The Constructor.

Santo Crimp—Sewage Disposal Works.

Shann—Elementary Treatise on Heat (*c*), (*d*).

Trautwine—Engineer's Pocket Book.

Unwin—Elements of Machine Design (*c*).

“ Testing of Materials of Construction.

Von Ott—Graphic Statics (*a*).

Williamson—Elasticity (*d*).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

**Text-Books and Books of Reference.**

- Auchincloss—Valve and Link motions (*c*).  
 Goodeve—Elements of Mechanism (*b*).  
 Halsey—Side Valve Gears.  
 Kennedy—Mechanics of Machinery (*b*), (*c*).  
 Rankine—Machinery and Millwork.  
 Reuleaux—Kinematics of Machinery.

**ELECTRICITY.**

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises—

**ELEMENTARY ELECTRICITY AND MAGNETISM.****MEASURING INSTRUMENTS—**

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

**MATHEMATICAL THEORY OF ELECTRICITY.****APPLICATIONS OF ELECTRICITY—**

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

**THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.****Text-Books and Books of Reference.**

- Bedell & Crehore—Alternating Currents.  
 Carhart & Patterson—Electrical Measurements (*b*), (*d*).  
 Bedell—Principles of the Transformer (*d*).



Fleming—Alternate Current Transformers, Vol. I and II. (*d*).

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe—Electrical Testing (*b*).

Loudon & McLennan—Practical Physics (*b*).

Stewart & Gee—Practical Physics.

Thompson, S. P.—Elementary Electricity and Magnetism.

“ Dynamo Electric Machinery.

“ Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE—

Egyptian, Assyrian and Persian.

Classic.

Romanesque and Byzantine.

Gothic.

Renaissance.

### ORDERS OF ARCHITECTURE.

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

#### Text-books and Books of Reference.

Fergusson—History of Architecture.

Fletcher—A History of Architecture.

Gwilt—Encyclopædia of Architecture.

Leeds—Orders of Architecture (*b*).

Osborne—Art of House Planning (*d*).

Owen Jones—Grammar of Ornament.

Racinet—L'Ornement Polychrome.

Rickman—Gothic Architecture,

Sharpe—Seven Periods of Church Architecture.

Smith, T. Roger—Classic and Early Christian Architecture (*a*), (*b*).

- Smith, T. Roger—Gothic and Renaissance (*c*).  
 Statham—Architecture for General Readers.  
 Sturgis—European Architecture.  
 Vignole—The Five Orders of Architecture (*b*), (*c*).

### MATHEMATICS AND PHYSICS.

The Pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

#### Text-Books and Books of Reference.

- Ganot—Physics (*b*).  
 Hall & Knight—Plane Trigonometry (*a*).  
 Loomis—Calculus (*b*).  
 Loudon & McLennan—Practical Physics (*b*)  
 Mackay—Elements of Euclid (*a*).  
 Newcombe & Holden—Astronomy (*b*).  
 Osborne—Calculus.  
 C. Smith—Conic Sections (*a*).  
 Hamblin Smith—Hydrostatics (*b*).  
 Balfour Stewart—Heat.  
 Todhunter—Algebra (*a*).  
 “ Spherical Trigonometry (*b*).  
 Tyndall—Sound.

### CHEMISTRY.

#### COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

Elementary chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

## COURSES IN THE UNIVERSITY OF TORONTO.

Inorganic chemistry.

Organic chemistry.

Chemical theory.

Physical chemistry.

## Text-Books and Books of Reference.

Allen—Commercial Organic Analysis.

Arnold—Steel Works Analysis.

Beilstein—Organic Chemistry.

Beringer—Text Book of Assaying.

Blair—Chemical Analysis of Iron and Steel.

Bloxam—Chemistry.

Bloxam & Blount—Chemistry for Engineers and Manufacturers.

Blyth, A. W.—Poisons.

Blyth, A. W.—Foods.

Bolley—Handbuch der Chemischen Technologie.

Dammer—Handbuch der Anorganischen Chemit.

Douglas & Johnson—Qualitative Analysis.

Fresenius—Qualitative and Quantitative Analysis.

Furman—Manual of Practical Assaying.

Jones—Practical Chemistry.

Meyer—History of Chemistry.

Miller & Smale—Qualitative Analysis.

Ostwald—Lehbuch der Allgemeinen Chemie.

Ostwald—Outlines of General Chemistry,

Pattison Muir—Thermo-Chemistry, Elements of

Post—Chemisch-technische Analyse.

Remsen—Inorganic and Organic Chemistry.

Richter—Inorganic and Organic Chemistry.

Roscoe & Schorlemmer—Treatise on Chemistry.

Sadtler—Organic and Applied Chemistry.

Sutton—Volumetric Analysis.

Thorp—Outlines of Industrial Chemistry.

Thorpe—Dictionary of Applied Chemistry.

Thorpe—Quantitative Analysis.  
Wagner—Chemical Technology.  
Walke—Lectures on Explosives.  
Watt—Dictionary of Chemistry.  
Winkler—Gas Analysis.

## MINERALOGY, GEOLOGY, MINING AND METALLURGY.

### 1. Mineralogy and Geology.

Mineralogy and crystallography.  
Geology and palæontology.  
Petrography.  
Physical geography.  
Blowpipe analysis.  
Determinative mineralogy.

### 2. Mining and metallurgy.

Mining geology.  
Ore dressing.  
Metallurgy of iron and steel.  
Metallurgy of nickel, copper, silver, etc.  
Assaying.  
Milling.

### Text-Books and Books of Reference.

Balling—Metallhuettenkunde.  
Chapman or Brush—Mineral Tables.  
Chapman—Mineralogy and Geology of Canada.  
Dana—Manual of Geology.  
Geikie—Text-Book of Geology.  
Harker—Petrography.  
Ihlseng—Manual of Mining.  
Kemp—Handbook of Rocks.  
Kemp—Ore Deposits of the United States.  
Kuhnhardt—Ore Dressing.  
Mitchell—Assaying by Crookes.  
Nicholson—Palæontology.

Phillips—Ore Deposits.

Phillips and Bauerman—Elements of Metallurgy.

Plattner—Manual of Blowpipe Analysis.

Roberts-Austen—Metallurgy.

Rosenbusch—Petrography.

Schnabel—Allgemeine Huettenkunde.

## VACATION WORK.

### THESIS AND CONSTRUCTION WORK.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next following examination.

### CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Country and Suburban Roads.

“ THIRD YEAR.—The Disposal of City Wastes—Sewage, Garbage, etc.

#### Books of Reference.

Byrne—Highway Construction.

Shaler—American Highways.

Spalding—Roads and Pavements.

Rafter and Baker—Sewage disposal in the United States.

**MINING ENGINEERING.**

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

**Books of Reference.**

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-shop  
Practice

“ THIRD YEAR.—Foundry Practice.

**Books of Reference.**

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

**ARCHITECTURE.**

For the Second year the following set of freehand pencil sketches is required :—

- I. Doorway from the object.
- II. Staircase “
- III. Fireplace with cross section.

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

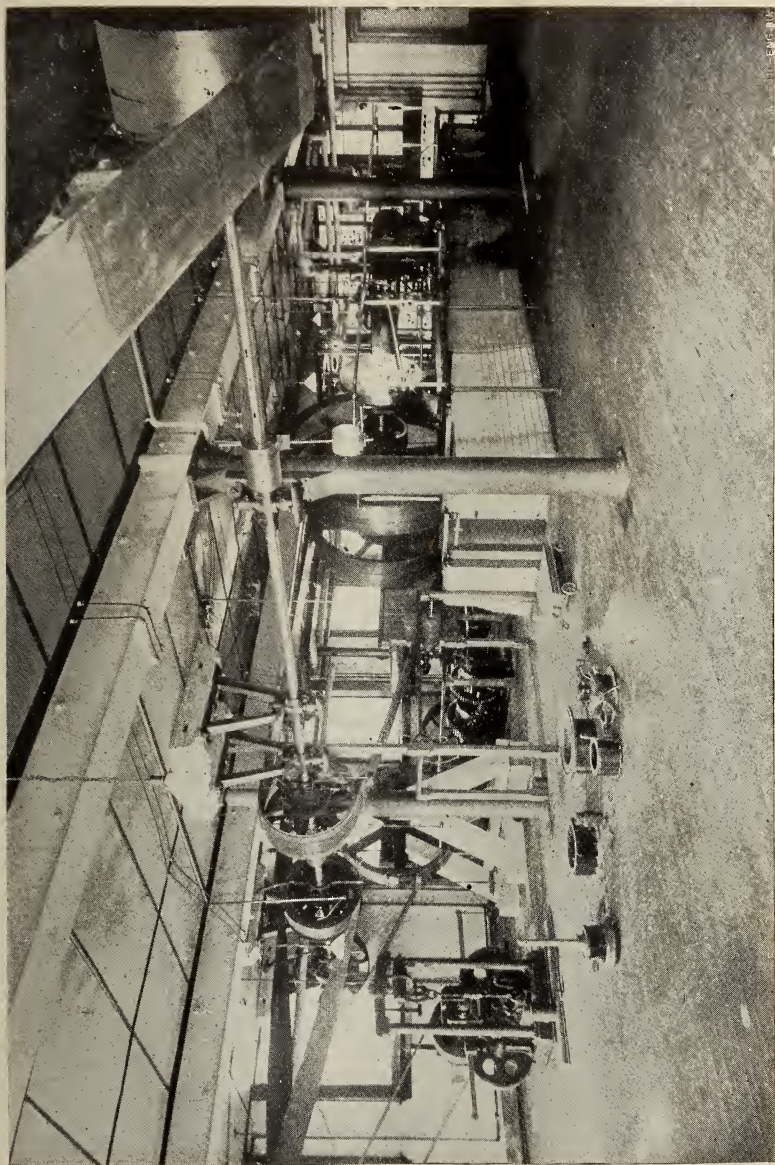
“ THIRD YEAR.—Twelve water-color studies.

**ANALYTICAL AND APPLIED CHEMISTRY.**

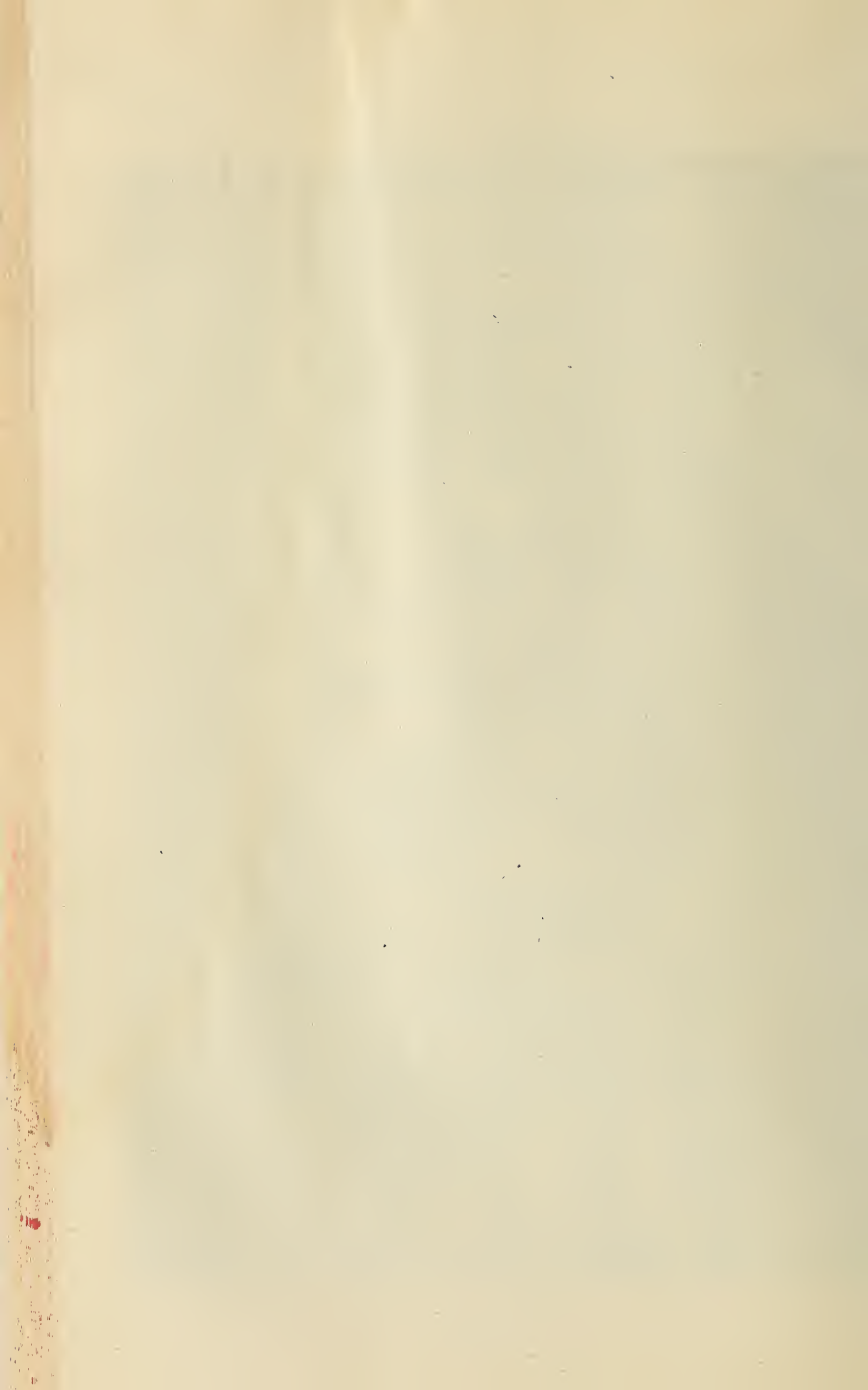
SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid  
and Alkali Manu-  
facture.

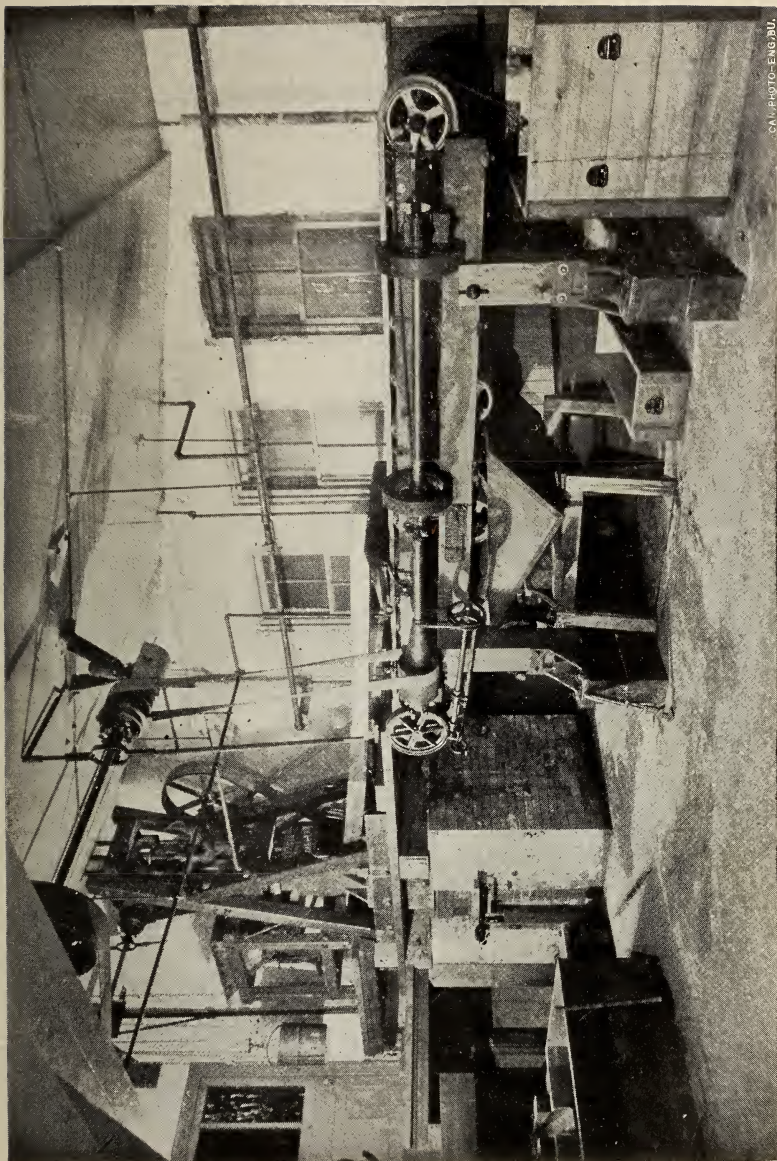
“ THIRD YEAR.—Coal Tar Products.





EXPERIMENTAL ENGINE.





CHU PHOTO-ENG BU.

STAMP MILL.





**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

**EXCURSIONS.**

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years. These excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

**STEAM ENGINE LABORATORY.**

The equipment of this department is as follows :

A Babcock and Wilcox 52 h. p. boiler.

A Harrison-Wharton 12—h. p. boiler.

A 50 h. p. Brown engine. This engine was constructed specially for experimental investigation. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser the latter of which was kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers. In addition there are the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers. anemometers, thermometers, a platinum and platino-rhodium thermo-couple, etc., etc.

### HYDRAULIC LABORATORY.

This laboratory is equipped with a three-throw pump with double acting cylinders having a capacity of 500,000 gallons per 24 hours. There are also large tanks furnished with orifices and weirs, measuring tanks etc. A centrifugal pump, a three-foot jet turbine, a nine-inch McCormick, and a six-inch new American Turbine, the latter the gift of the firm of William Kennedy & Sons, Owen Sound, form a part of the same equipment. There are also the usual measuring instruments, gauges, gauge testing apparatus, scales, brakes and dynamometers.

### STRENGTH OF MATERIALS LABORATORY.

The machines in this department are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 10-ton universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity adapted to specimens up to forty-eight inches in length.

A Riehle abrasion machine, for testing the resistance to attrition of stones, brick, etc.

Extensometers of the Bauschinger, Unwin, Marshall and other types besides a large number of micrometers and scales.

A shop has been fitted up with a number of high-class machine tools specially fitted for reducing the specimens to



the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs and for making special apparatus for original investigation.

### CEMENT TESTING LABORATORY.

This department is fitted with all the usual molds, gravimeters tables and tank accomodation necessary in a well equipped laboratory.

In this laboratory there are also the following :

A Riehle 2,000-pounds machine fitted for either tension or compression.

A Riehle 600-pounds machine fitted for tension only.

An extra large Faija's hot bath apparatus.

### METROLOGICAL LABORATORY.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length ; a 10-foot Rogers comparator with a graduating attachment ; a Kater's pendulum with vacuum chamber ; a Howard astronomical clock and electro-chronograph ; a Troughton & Simms 10-inch theodolite, eight surveyor's transits, seven levels, compasses, sextants, plane tables, micrometers, planimeters, etc. ; and all the necessary field instruments.

### ELECTRICAL LABORATORY.

In one section of this laboratory a 20 kilo-watt Edison motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, a Westinghouse experimental alternator, and a rotary transformer when used as a polyphase dynamo. Of direct current motors, besides the one already mentioned, there are a Crocker-Wheeler machine and a 6 h.p. Edison motor, used in the mill-room, but available for testing ; besides fan motors. Of alternating current

motors the rotary converter may be operated on two or three phase circuits, or may, as a dynamo, supply a three phase induction motor. There are also three smaller alternating current motors, one series, and two "split-phase" motors for different frequencies. A marble switch-board in this room facilitates connection between different circuits, both locally and for other parts of the building. It is supplied with 110 and 220 volts, direct current, and the same voltages of alternating current of 60 cycles from the city circuits, in addition to the range of supply that may be had from the school generators and storage cells. Four switches which may be connected in any of the circuits, two sets of bus-bars for paralleling, automatic circuit breakers, arc and incandescent lamp circuits, and four controlling rheostats are connected, and means are provided for readily connecting measuring instruments in any circuit.

Another section is the galvanometer room in which are ten masonry piers to support instruments in such a way as to be free of vibration.

An adjoining room is the laboratory for advanced work, not yet quite complete, in which may be mentioned a Kelvin Balance and its rheostat, and an enclosure within which experiments with high voltages may be safely performed. Marble switchboards are being placed in this room, and in the galvanometer room to connect with "Chloride" storage batteries of large and small cells located on a gallery in a separate room, and apparatus for convenience in standardizing measuring instruments will be set up here. Among the instruments and apparatus may be mentioned :—Numerous D'Arsonval galvanometers of Carpentier, Rowland and other designs, ballistic galvanometers, a Thomson galvanometer, telescopes and scales, divided microfarad condenser, Kempe discharge key, rheostats and proportional arms for Wheatstone bridge

and other purposes, slide wire metre bridges, including special bridge for electrolytic resistance ; standard resistances, including megohm, 10 ohms, several copies of the ohm, divided ohm, one hundredth and one thousandth ohm standards, certified by the Charlottenburg Reichsanstalt, the later with oil bath and stirrer ; Willyoung potentiometer, standard cells, Clark and Helmholtz, Kohlrausch tubes for measurement of electrolytic resistance, Lippmann electrometers, Cascart electrometer, Nernst electrometer. Besides these, are numerous Weston instruments including wattmeter, voltmeters for direct and alternating current, ammeters, and milammeters, Thomson and Whitney ammeters and voltmeters, Siemens electro-dynamometer, Kelvin balance, Kelvin high potential electrostatic voltmeter, and electrostatic multicellular voltmeter ; Thomson recording wattmeters (including one for three phase), Shallenberger recording ammeter ; lightning arresters, Westinghouse, Stanley Wagner and Thomson Houston transformers, and a General Electric 10,000 volt testing transformer, high potential condenser, Wimshurst influence machine, Ruhmkorff coils, Crooke's tubes, fluoroscope wireless telegraph apparatus ; Hopkinson permeameter for testing the magnetic qualities of iron, instruments for measuring instantaneous current and voltage in alternating current circuits, according to Duncan, Fessenden contact maker, earth inductor, Ayrton and Perry secohmmeter, fixed and variable standards of inductance, double sets of telegraph and telephone apparatus ; Lummer-Brodhum and Bunsen photometers with accessories for arc and incandescent light photometry and Hefner standard amyl acetale lamp (these however are not as yet set up). Copper volta-meters, balances, thermometers, portable rheostats and numerous minor appliances complete this portion of the equipment. Among arc lights may be mentioned the Manhattan, Upton, Adams-Bagnall, Toerring, Thomson, Saf-

ford and United Electric long burning enclosed arcs, Thomson and other lamps for alternating current, the Ward and Universal (two in series on 110 volt circuits), the Thomson Houston and Ball for series circuits, and one the gift of Mr. W. A. Turbayne.

### MINERALOGICAL LABORATORY.

This laboratory contains a collection of hand specimens of minerals and rocks for the purpose of training students in handling and becoming familiar with the more common varieties of both ; it is also provided with balances for determining the specific gravity of minerals.

Blowpipe instruction is given here, there being seating room, blow-pipe burners and accommodation for thirty-six students working at once.

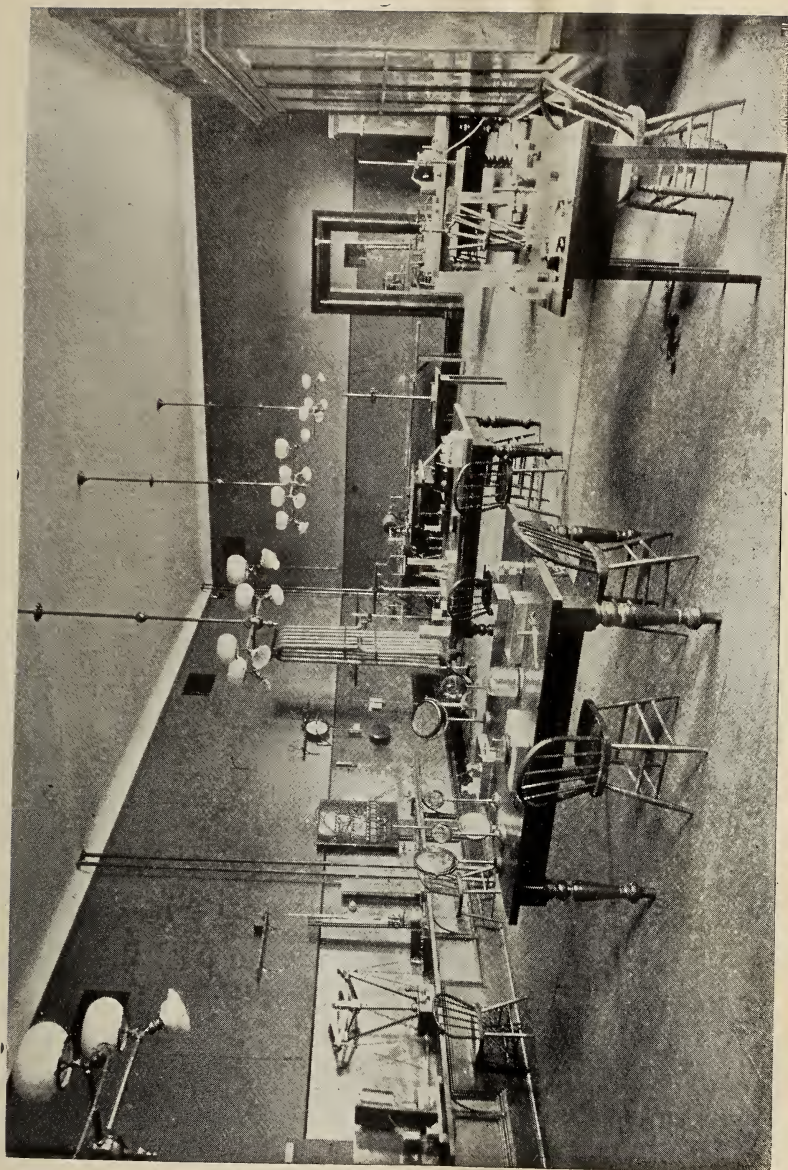
### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two Brown coke furnaces for crucibles and muffles, two pulverizers, a muller, and all other necessary appliances for pulverizing and preparing ores for fire assay. The pulp balances for weighing charges and the delicate balances for weighing gold and silver buttons are kept in a room opening off the assay laboratory. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope ; also the necessary appliances for making rock sections by hand. Four petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silvered copper plates, and a Frue Vanner. The





ELEMENTARY PHYSICAL LABORATORY (UNIVERSITY OF TORONTO).







ARCHITECTURAL LECTURE ROOM.



concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse-power Edison motor, which is supplied with current from the city circuit. The mill room is also provided with settling tanks for the tailings and concentrates. During last year a pair of Hamilton rolls for dry crushing was added to the mill equipment.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a large brick assay furnace and a reverberatory furnace for roasting sulphide and arsenical ores ; leaching vats for treating ores by the cyanide process and a chlorination plant.

This completes the equipment for treating gold ores, and makes it possible to extract the gold from the concentrates saved by the Frue Vanner.

### CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratory will accommodate about 20 students. It is furnished with convenient work tables, and fume cupboards, and supplied with the most recent apparatus for gravimetric, volumetric and gasometric

analysis, both scientific and technical. Besides balances by the best makers, and of the most recent construction, furnaces for fusion, organic analysis, etc., and all the requisites for the assay of ores, furnace and other technical products in the wet way, the apparatus includes an experimental vaccum pan, a filter press, the latest forms of Fischer's and Mahler's apparatus for the determination of the heating power of fuel, facilities for the electrolytic determination of metals, including a Gulcher thermo-electric pile; spectroscopes, polariscopes and microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

During the past year a Junker's calorimeter for determining the heating power of gaseous and liquid fuels has been added, as well as a large polariscope, by Schmidt and Haenseh, fitted with triple field of vision. A new laboratory for gas analysis and calorimetric work, with as nearly as possible constant temperature, is about to be fitted up, and will be ready before the 1st of October, 1900.

### PHYSICAL LABORATORY.

#### University of Toronto.

The physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.



### MUSEUMS.

The Geological Museum includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes ; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive, schistose and sedimentary rocks ; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The paleontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

### LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference in the subjects of study pursued in the school has been formed and is being added to year by year.

## LIST OF DONORS TO THE LIBRARY.

- American Society of Civil Engineers—Proceedings.  
Association of Engineering Societies—Journal.  
Blackwood, A. E.,—Stone.  
Bureau of Mines—Report.  
Canadian Mining Institute—Journal.  
Columbia University—Quarterly.  
Department of Mines, Nova Scotia—Report.  
Geological Survey of Canada—Report.  
Gzowski, Estate of the late Sir Casimir—  
    Transactions of American Society of Civil Engineers,  
        1874-1898.  
    Transactions of Canadian Society of Civil Engineers,  
        vol. I, 1887—vol. XII, 1898.  
    Proceedings of The Institution of Civil Engineers,  
        vol. LXIII, 1880—vol. CXXXII, 1898.  
Institution of Engineers and Shipbuilders in Scotland—  
    Transactions.  
Institution of Junior Engineers—Transactions.  
Institution of Mechanical Engineers—Proceedings.  
Royal Institute of British Architects—Journal and Pro-  
    ceedings.  
Society of Chemical Industry—Journal.  
Societe des Ingenieurs Civils de France—Memoires.  
United States Coast and Geodetic Survey—Report.  
United States Government Tests of Metals, etc.—Report  
University of Toronto—Studies.
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**GYMNASIUM AND ATHLETIC GROUNDS.**

*(From the Calendar of the University of Toronto.)*

“The University Gymnasium was completed and equipped in 1893. It is fully provided with the best and most modern appliances for physical culture, and contains a running track, shower baths and swimming bath, besides the necessary dressing-rooms and other conveniences. A competent instructor in Gymnastics is in constant attendance to superintend and direct the exercises of students. In addition to the lawn in front of the main University Building and the campus in the rear, a large plot of ground on Devonshire Place has been prepared and set apart as an Athletic Field. By this addition the facilities for football, cricket, tennis and other out-door athletic sports are doubled, as compared with previous accommodation ; and by these grounds, in conjunction with the Gymnasium, ample opportunity is afforded to all students for healthful exercise and physical development. To assist in meeting the expenses of the Gymnasium, a nominal annual fee is imposed on those who avail themselves of its advantages. The supervision of all athletic matters has been intrusted by the Councils to an Athletic Board, consisting of six members appointed from the Faculty and the officers of the Athletic Association. All applications of clubs for the use of grounds must be made annually to this Board. All such applications must be accompanied by a list of officers. In the case of new clubs, the list of officers must be accompanied by particulars as to the organization and objects of the club making application.”

**STUDENTS' UNION BUILDING.**

*(From the Calendar of the University of Toronto.)*

“In 1894, additions were made to the front of the building in which the Gymnasium is situated, consisting of a large hall for public meetings, a reading-room and committee-rooms. This additional accommodation is available for the work of the various student societies and for academic purposes. Applications for the use of rooms,

accompanied by a list of officers and a copy of the constitution of the society making application, must be made, through the President, to the joint committee of the Councils on Gymnasium and Students' Union Building, at the beginning of the session, or from time to time as occasion requires. Arrangements have also been made by which recognized societies may obtain the use of committee-rooms on application to the janitor of the Students Union Building

### LODGING AND BOARD.

Accommodation is readily obtainable in numerous private boarding-houses within convenient distance of the School, at a cost of from three dollars upwards for comfortable lodging with board ; or rooms may be rented at a cost of from one dollar per week upwards, and board obtained separately at moderate rates. A list of accredited boarding-houses is kept by the Secretary of the University College Young Men's Christian Association, and students are recommended to consult him with reference to the selection of suitable accommodation.

### RUGBY FOOTBALL.

The Mulock Cup, which was presented by the Hon. Wm. Mulock, M.A., LL.D., to the University of Toronto Rugby Football Club for inter-college competition, brings out each year a large number of contestants from the University and affiliated colleges.

#### Rugby Football Club of the School of Practical Science.

##### OFFICERS.

Hon. President .....	Principal Galbraith.
President .....	J. T. M. Burnside.
Sec.-Treas. and Manager .....	G. E. Revell.
Captain ....	R. E. McArthur.
III. Year Representative .....	G. W. Dickson.
II.   "               "	.....J. M. Fotheringham.
I.     "               "	.....A. J. Isbester.

## LIST OF PLAYERS.

Bertram, G. H.	Hunt, G. A.
Burnside, J. T. M.	Isbester, A. J.
Campbell, W.	Lang, A.
Dickson, G. W.	McArthur, R. E., Capt.
Douglas, W. E., B.A.	Macdonald, W. R.
Empey, J.	McLennan, A. L.
Fotheringham, J. M.	Parsons, W. R. W.
Gibson, A.	Taylor, A.
Harvey, C.	Thorne, S. M.

## ASSOCIATION FOOTBALL.

In order to encourage Association Football on the College Campus, the Faculty of the University of Toronto presented a cup, known as the Faculty Cup, to the Inter-College Association Football Club for annual competition among the University and affiliated colleges.

*Association Football Club of the School of Practical Science.*

## OFFICERS.

Hon. President .....	C. H. C. Wright, B.A.Sc.
President .....	G. E. Revell.
Sec.-Treas. and Manager .....	S. E. M. Henderson.
Captain .....	F. C. Jackson.
III. Year Representative .....	C. H. Fullerton.
II    "                "                .....	R. H. Barrett.
I.    "                "                .....	W. Campbell.

## LIST OF PLAYERS.

Barrett, R. H.	Gibson, A.
Beardmore, C. O.	Heron, J. B.
Boehmer, C. H.	Jackson, F. C., Capt.
Brereton, W. P.	McKay, J. J.
Broughton, J. F.	Miller, W. R.
Campbell, W.	Taylor, A.
Depew, H. H.	Whelihan, J. A.

## HOCKEY.

The trophy which is competed for annually among the Colleges in Hockey is known as the Jennings Cup, and is the gift of Wm. T. Jennings, Mem. Inst. C.E., Consulting Engineer.

## Hockey Club of The School of Practical Science.

## OFFICERS.

Hon President.....	Dr. Ellis.
President .....	J. A. Johnston.
Vice-President .....	G. E. Revell.
Sec. and Treas .....	W. R. Macdonald.
Manager .....	F. C. Jackson.
Captain .....	A. J. Isbester.
III. Year Representative .....	S. M. Thorne.
II.    "                "	.....A. L. McLennan.
I       "               "	... ..F. R. Miller

## LIST OF PLAYERS.

Benson, F. B. F.	Macdonald, W. R.
Isbester, A. J., Capt.	Marrs, C. H.
Jackson, F. C.	Morley, R. W.
Lang, A.	Thorne, S. M.
McArthur, R. E	

## FENCING.

For Fencing, a number of trophies have been presented to the Club, and great interest is taken in the annual competitions for championships. The medal which represents the Inter-College Championship of Canada and is the gift of the University of Toronto Fencing Club. The medal presented for Senior Foils is the gift of Mr. E. I. Sifton, a former student at the school, while the pair of foils for the junior fencing is given by Mr. H. A. Wilson.

## Fencing Club of the University of Toronto.

## OFFICERS.

Hon. President.....	E. I. Sifton.
President .....	R. M. Millman, Arts.
Vice-President .....	G. Bertram, S.P.S.
Sec. and Treas.....	W. A. Duff, S.P.S.
Maitre d'Armes .....	Serg. Williams.

## FENCING TEAM OF THE SCHOOL OF PRACTICAL SCIENCE.

Duff, W. A. Capt	Roaf, J. R.
Forbes, D. L. H.	Smith, A. H.
Gagne, L.	

THE ENGINEERING SOCIETY OF THE SCHOOL OF  
PRACTICAL SCIENCE.

## Officers for 1899-1900.

<i>President</i> .....	T. SHANKS.
<i>Vice-President</i> .....	J. A. JOHNSTON.
<i>Recording Secretary</i> .....	J. P. RIGSBY.
<i>Treasurer</i> .....	W. G. CHACE.
<i>Corresponding Secretary</i> .....	J. C. JOHNSTON.
<i>Editor</i> .....	A. H. ROBINSON, B.A.Sc.
<i>Librarian</i> .....	E. H. PHILLIPS.
<i>Assistant Librarian</i> .....	D. E. EASON.
<i>Graduates' Representative</i> .....	L. B. CHUBBUCK.
<i>Fourth Year</i> do      ...	W. E. WAGNER.
<i>Third Year</i> do      ....	H. A. DIXON.
<i>Second Year</i> do      ....	M. V. SAUER.
<i>First Year</i> do      ....	W. R. MACDONALD.

## Officers for 1900-1901.

<i>President</i> .....	F. W. THOROLD.
<i>Vice-President</i> .....	W. G. CHACE.
<i>Recording Secretary</i> .....	A. LANG.
<i>Treasurer</i> .....	R. W. MORLEY.
<i>Corresponding Secretary</i> .....	W. P. BRERETON.
<i>Editor</i> .....	To be appointed.
<i>Librarian</i> .....	G. A. HUNT.
<i>Assistant Librarian</i> .....	A. A. WANLESS.
<i>Graduates' Representative</i> ....	C. H. FULLERTON.
<i>Fourth Year</i> do      ....	J. R. ROAF.
<i>Third Year</i> do      ....	J. T. BROUGHTON.
<i>Second Year</i> do      ....	J. J. MCKAY.
<i>First Year</i> do      ....	To be appointed.

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society publishes a pamphlet annually, containing the best papers read at its meetings.

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## SESSION 1899-1900,

## STUDENTS IN ATTENDANCE.

## FIRST YEAR.

## Regular Students.

3. Barber, H. G. . . . . Milton.
2. Belton, C. H. . . . . London.
1. Blair, W. J. . . . . Embro.
3. Brown, J. M. . . . . Fergus.
1. Burwash, N. A. . . . . Toronto.
2. Campbell, W. . . . . Fullerton.
3. Challies, J. B. . . . . Winchester.
2. Christie, W. . . . . Chesley.
3. Connor, V. H. . . . . Sarginson.
3. Corrigan, T. E. . . . . Carlisle.
1. Costin, W. E. . . . . Gobles.
2. Culbert, M. T. . . . . London.
3. Depew, H. H. . . . . Hamilton.
1. Douglas, W. E B.A. . . . . Toronto.
3. Dunlop, R. J. . . . . Toronto.
2. Edwards, W. M. . . . . Iroquois.
2. Empey, J. M. . . . . Thamesford.
1. Gibson, A. . . . . Ingersoll.
3. Goodwin, A. C. . . . . Grimsby.
1. Gourlay, W. A. . . . . Toronto.
1. Hayes, L. J. . . . . Toronto.
3. Henwood, C. . . . . Port Hope.
1. Heron, J. B. . . . . Scarboro Junction
2. Isbester, J. A. . . . . Ottawa.

4. Keagey, J. W ..... Dundas.
3. Lang, A. G ..... Toronto.
5. Langmuir, F. L ..... Toronto.
3. Laschinger W. A. .... Elmira.
3. McBride, A. H ..... Toronto.
3. McKellar, J. O ..... Penetanguishene.
3. MacKay, J. T. .... Toronto.
1. Mackay, J. J., O.L.S ..... Woodstock.
3. Madden, J. F. S ..... Toronto.
3. Mathison, P. .... Union.
3. Marrs, C. H ..... Beamsville.
3. Mitchell, P. H ..... Waterloo.
1. Morley, R. W ..... Toronto.
3. Mullins, E. E ..... Toronto.
1. Nash, T. S. .... Morrisburg.
3. Nevitt, I. H ..... Toronto.
3. Patten, B. B ..... St. George.
2. Parsons, W. R. W ..... Toronto.
2. Powell, G. G ..... Toronto.
1. Ratz, W. F ..... Elmira.
1. Robertson, D. F ..... Almonte.
3. Roy, J. E ..... Listowell.
3. Seymour, H. L ..... Toronto.
3. Shuff, F. K. .... London.
3. Sinclair, D ..... Cheltenham.
2. Steel, I. J. .... Boxall.
2. Stevens, W. A ..... Chatham.
3. Stewart, J. W ..... Hempstead.
3. Taylor, T. .... Cheltenham.
2. Teasdale, C. .... Concord.
3. Whelihan, J. A ..... St. Mary's.

**Non-Regular Students taking full courses.**

3. Algie, J. .... Halton.
1. Alison, J. G. R ..... Toronto.
- Allan, J. F ..... Toronto.

3. Banting, E. W . . . . . Toronto.
1. Beardmore, C. O . . . . . Toronto.
3. Beatty, E. R . . . . . Welland.
3. Breslove, J . . . . . Toronto.
1. Campbell, A. R . . . . . Collingwood.
1. Carter, E. W . . . . . Toronto.
2. Conlon, F. T . . . . . Goble's.
2. Cumming, R. . . . . Scotsburn N. S.
1. Dalrymple, G. H . . . . . Port Elgin.
2. Dunn, H . . . . . Vancouver, B. C.
2. Elmsley, B. R . . . . . Toronto.
2. Elwell, W. J . . . . . Toronto.
3. Fuller, V. M. S . . . . . Toronto.
1. Fuller, T. H . . . . . Leamington.
3. Greenwood, W. R . . . . . Toronto.
3. Hutchinson, J. G . . . . . Wardsville.
3. Johnston, D. M . . . . . Toronto.
2. MacKinnon, H. D . . . . . Finch.
1. Macdonald, W. R . . . . . Toronto.
3. Marquis, G. P . . . . . Brantford.
2. Millar, A. H . . . . . Berlin.
2. Millar, C. J . . . . . Toronto.
1. Miller, F. R . . . . . Ingersoll.
1. Moore, F . . . . . Toronto.
3. Osborne, J. P . . . . . Toronto.
2. Philp, D. H . . . . . Petrolea.
3. Reid, T . . . . . Toronto.
3. Robertson, E. A . . . . . Clayton.
3. Robertson, H. D . . . . . Walkerton.
1. Stewart, M. A . . . . . Toronto.
3. Shingler, T. W . . . . . Brooklyn, N. Y.
3. Thompson, W. J . . . . . Carberry, Man.
3. Wanless, A. A . . . . . Toronto.

## SECOND YEAR.

1. Barrett, R. H. .... Gesto.
3. Beatty, F. R. .... Toronto.
3. Beatty, W. G. .... Fergus
3. Benson, T. B. F. .... Port Hope
3. Bertram, G. M. .... Toronto.
2. Bolger, E. B. .... Lindsay.
3. Bowers, W. J. .... Toronto.
3. Brandon, E. T. .... Toronto.
3. Brereton, W. P. .... Bethany.
3. Broughton, J. T. .... Harriston.
3. Carmichael, C. G. .... Markham.
3. Chace, W. G. .... St Catharines.
3. Christie, A. G. .... Manchester
3. Clarke, N. .... Toronto.
3. Cockburn, J. R. .... Toronto
1. Duff, W. A. .... Hamilton.
2. Eason, D. E. .... Keene.
2. Forbes, D. L. H. .... Toronto.
3. Fotheringham, J. M. .... Rothsay [P. Q.
1. Gagne, L. .... St. Joseph d'Alma,
3. George, R. E. .... Port Elgin.
3. Gibson, N. R. .... Toronto.
2. Hamer, A. T. E. .... Bradford.
1. Harvey, C. .... Indian Head.
2. Henry, J. S. .... Toronto.
3. Hunt, G. A. .... Galetta.
2. Jackson, F. C. .... Seaforth.
3. Laidlaw, A. .... Durham.
3. McCollum, G. C. .... Welland.
3. Macdougall, A. C. .... Toronto.
2. MacLennan, A. L. .... Toronto.
3. MacMaster, A. T. C. .... Toronto.
1. McMillan, G. .... South Finch.
3. McVean, H. G. .... Dresden.

3. Mace, F. G . . . . .Toronto.
3. Mennie, R. S . . . . .Toronto.
3. Middleton, H. T . . . . .Toronto.
2. Parsons, J. L. R., B.A. . . . .Toronto.
3. Price, H. W . . . . .Toronto.
3. Rigsby, J. P . . . . .Toronto.
1. Rust, H. P . . . . .Toronto.
3. Sauer, M. V . . . . .Toronto.
4. Shepherd, W. F . . . . .St. Mary's.
1. Sill, J. A . . . . .Jarvis.
3. Stevenson, W. H . . . . .Lancaster.
1. Twiss, A. T . . . . .Glencoe.

## THIRD YEAR.

1. Allan, J. L . . . . .Halifax. N. S.
2. Ardagh, E. G. R. . . . .Toronto.
3. Bain, J. A . . . . .Woodstock.
3. Barley, J. H . . . . .Mitchell.
2. Boswell, M. C . . . . .Peterboro.
1. Bray, L. T. . . . .Amherstburg.
3. Clark, J. . . . .St. Helens.
1. Clarke, F. F . . . . .Deer Park.
2. Davison, J. E . . . . .Toronto.
3. Dickinson, E. D . . . . .Barrie.
3. Dickson, G . . . . .Toronto.
2. Dixon, H. A . . . . .Eglington.
2. Fullerton, C. H . . . . .Atwood.
3. Guest, W. S . . . . .Elginfield.
3. Hemphill, W . . . . .Toronto.
3. Henderson, S. E. M . . . .London.
3. Henry, J. A . . . . .Belton.
2. Holcroft, H. S. . . . .Toronto.
3. Johnston, H. A . . . . .Toronto.
2. Johnston, J. A . . . . .Pefferlaw.
3. Johnston, J. C . . . . .Toronto.
3. Lumbers, W. C . . . . .Toronto.

2. McArthur, R. E. . . . . Toronto.
2. Mackenzie, J. R. . . . . Toronto.
2. McMillan, J. G. . . . . Dutton.
3. Miller, L. H. . . . . Aylmer.
2. Neelands, E. V. . . . . Lindsay.
1. Phillips, E. H. . . . . Minden.
2. Roaf, J. R. . . . . Toronto.
3. Rounthwaite, C. H. E. . . . Collingwood.
2. Saunders, H. W. . . . . Petrolea.
1. Taylor, A. . . . . Toronto.
1. Tennant, W. C. . . . . Toronto.
2. Thorne, S. M. . . . . Toronto.
1. Thorold, F. W. . . . . Toronto.
1. Weir, H. M. . . . . Brantford.
3. Withrow, F. D. . . . . Toronto.

#### FOURTH YEAR.

- Burnside, T. . . . . Toronto.
- Chubbuck, L. B. . . . . Ottawa.
- Coulthard, R. W. . . . . Toronto.
- Hare, W. A. . . . . Dartmouth, N.S.
- Monds, W. . . . . Caledon. East.
- Revell, G. E. . . . . Woodstock.
- Richards, E. . . . . Brockville.
- Shanks, T. . . . . Moose Creek.
- Tennant, D. C. . . . . Toronto.
- Wagner, W. E. . . . . Toronto.

#### Occasional Students.

- Anderson, A. W. . . . . Sutton W.
- Boehmer, C. H. . . . . Berlin.
- Clendening, W. G. . . . . Walkerton.
- Keays, J. A. . . . . Montreal
- McMichael C. M. . . . . Toronto
- Murphy C. E. . . . . Hepworth.
- Smith, A. H. . . . . Toronto
- Swannell, F. C. . . . . Toronto
- Wallbridge, G. . . . . Toronto.



## PRIZEMEN.

## Engineering.

1879. — I. Year . . . . J. McAREE . . . . . 1st prize.  
 1880. — II. Year . . . . J. L. MORRIS . . . . . 1st prize.  
 1881. — I. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
           II. Year . . . . D. JEFFREY . . . . . 1st prize.  
 1882. — I. Year . . . . A. R. RAYMER . . . . . 1st prize.  
           I. Year . . . . E. W. STERN . . . . . 2nd prize.  
           II. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
           III. Year . . . . D. JEFFREY . . . . . 1st prize.  
 1883. — I. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
           I. Year . . . . A. M. BOWMAN . . . . . 2nd prize.  
           II. Year . . . . A. R. RAYMER . . . . . 1st prize.  
           II. Year . . . . E. W. STERN . . . . . 2nd prize.  
           III. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
 1884 — II. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
           III. Year . . . . E. W. STERN . . . . . 1st prize.  
           III. Year . . . . A. R. RAYMER . . . . . 2nd prize.  
 1885 — I. Year . . . . A. F. LOTT . . . . . 1st prize.  
           I. Year . . . . J. ROGER . . . . . 2nd prize.  
           II. Year . . . . T. K. THOMPSON . . . . . 1st prize.  
           III. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
 1886. — I. Year . . . . C. H. C. WRIGHT . . . . . 1st prize.  
           I. Year . . . . J. E. ROSS . . . . . 2nd prize.  
           II. Year . . . . A. E. LOTT . . . . . 1st prize.  
 1887. — I. Year . . . . H. E. T. HAULTAIN . . . . . 1st prize.  
           II. Year . . . . C. H. C. WRIGHT . . . . . 1st prize.  
           III. Year . . . . A. E. LOTT . . . . . 1st prize.  
           III. Year . . . . J. ROGER . . . . . 2nd prize.  
 1888 — I. Year . . . . E. B. MERRILL . . . . . 1st prize.  
           I. Year . . . . F. M. BOWMAN . . . . . 2nd prize.  
           II. Year . . . . D. D. JAMES . . . . . 1st prize.  
           III. Year . . . . C. H. C. WRIGHT . . . . . 1st prize.  
 1889 — I. Year . . . . J. K. ROBINSON . . . . . 1st prize.  
           I. Year . . . . G. E. SILVESTER . . . . . 2nd prize.

	II. Year.....	E. B. MERRILL.....	1st prize
	II Year.....	F M. BOWMAN.....	2nd prize
	III. Year.....	D D JAMES.....	1st prize
1890.—	I Year.....	C. FAIRCHILD.....	1st prize
	II Year.....	J K ROBINSON.....	1st prize
	III. Year.....	F. M. BOWMAN.....	1st prize
	III. Year.....	E. B. MERRILL.....	2nd prize
1891.—	I Year.....	A J MCPHERSON.....	1st prize.
	I Year.....	R B. Watson.....	2nd prize
	II Year.....	J B. GOODWIN.....	1st prize
	III Year.....	G. E. SILVESTER.....	1st prize
	III Year.....	C. W. DILL.....	2nd prize
1892.—	I Year ...	A. E. BERGEY.....	1st prize
	I Year.....	R. W. ANGUS.....	2nd prize
	II. Year.....	A. J. MCPHERSON.....	1st prize
	II Year.....	R. B. WATSON... ..	2nd prize.
	III Year.....	E J. LASCHINGER.....	1st prize
	III. Year.....	C FAIRCHILD.....	2nd prize.

The grant for prizes was withdrawn at the close of 1892

#### Architecture.

The prizes in Architecture is the gift of Mr. D. B Dick, Architect, Toronto.

1891 —	I Year.....	H BALLANTYNE.
1892 —	I. Year.....	J A. EWART
1893 —	I. Year .....	A HARKNESS
1894 —	I Year.....	E. A FORWARD.
1895 —	I. Year.....	W F. Scott,
1896 —	I. Year .....	D. MACKINTOSH.
1899 —	I. Year.....	W F. SHEPHERD

#### Civil Engineering.

The prize in Civil Engineering is the gift of Mr. T. Ken-  
nard Thomson, C. E., New York

1897.—	III. Year.....	M. B. WEEKES.
1898 —	III Year.....	J. A. STEWART.
1899.—	III. Year.....	T. SHANKS.

**Mechanical and Electrical Engineering.**

Donor, Mr. F. A. Riehle, Philadelphia.

1897.—III. Year . . . . .A. T. GRAY.

1898.—III. Year . . . . .F. C. SMALLPIECE.

**Certificates in Mining and Metallurgy.**

Date of certificate.	Name.	Date of certificate.	Name.
1896..	Johnson, G.	1896..	Tye, A. T.
1898..	McMillan, A. N.	1897..	Webster, E. B.

**Certificate in Electricity.**

Date of certificate.	Name.
1896.....	Sifton, E. I.

**UNIVERSITY OF TORONTO.****Degree of Bachelor of Applied Science (B.A.Sc.)**

Date of admission.	Name.	Date of admission.	Name.
1893	Alison, T. H.	1898	Gray, A. T.
1897..	Angus, R. W.	1897..	Haight, H. V.
1896..	Armstrong, J.	1898..	Gray, A. T.
1897..	Bain, J. W.	1897	Haight, H. V.
1894..	Ballantyne, H. F.	1897..	Harkness, A. H.
1895	Beauregard, A. T.	1895..	Herald, W. J.
1899	Boyd, W. H.	1896	Hull, H. S.
1896	Brödie, W. M.	1894	James, D. D.
1895	Bucke, W. A.	1893	James, O. S.
1898..	Carpenter, H. S.	1895	Job, H. E.
1899..	Carter, W. E. H.	1895	Johnson, S. M.
1898	Charlton, H. W.	1896..	Johnson, A. C.
1894..	Chewett, H. J.	1894	Keele, J.
1896.	Dobie, J. S.	1899	Korman, J. S.
1897..	Elliott, H. P.	1894..	Laidlaw, J. T.
1895..	Ewart, J. A.	1893	Laing, A. T.
1894.	Goodwin, J. B.	1893	Laschinger, E. J.
1899..	Grant, W. F.	1893..	Lawson, W.

1893..Lea, W. A.	1895..Minty, W.
1894..McAllister, A. L.	1894..Mitchell, C. H.
1895..McAllister, J. E.	1898..Robinson, A. H. A.
1893..McAree, J.	1895..Shields, J. D.
1897..Macallum, A. F.	1899..Shipley, A. E.
1893..McEntee, B.	1894..Speller, F. N.
1896..McGowan, J.	1898..Smillie, R.
1896..McKinnon, H. L.	1894..Squire, R. H.
1894..McPherson, A. J.	1898..Stull, W. W.
1895..McTaggart, A. L.	1893..Thomson, R. W.
1897..Macbeth, C. W.	1896..Tremaine, R. C. C.
1897..Martin, T.	1898..Weekes, M. B.
1894..Merrill, E. B.	1899..Williamson, D. A.
1893..Milne, C. G.	1893..Wright, C. H. C.
1896..Mines, W. H.	

## Degree of Civil Engineer (C.E.)

Date of admission.	Name.	Date of admission.	Name.
1898..	Alison, T. H.	1895..	McAllister, J. E.
1898..	Ashbridge, W. T.	1898..	Mitchell, C. H.
1895..	Bowman, A. M.	1896..	Moore, J. E. A.
1893..	Bowman, F. M.	1885..	Morris, J. L.
1892..	Chewett, H. J.	1892..	Thomson, T. K.
1893..	Innes, W. L.	1894..	Tyrrell, H. G.
1886..	Kennedy, J. H.	1889..	Tyrrell, J. W.

## Degree of Mining Engineer (M.E.)

Date of admission.	Name.
1897.....	Bucke, M. A.

## Degree of Electrical Engineer (E.E.)

Date of admission.	Name.
1896.....	Ross, R. A.

## GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

Year.	Dept.	Name.	Address.
1892..	1	Alison, T. H., B.A.Sc., C.E., Chief Engineer . . .	Augustus Smith & Co., 39, 41 Cortlandt St., New York.
1892..	1	Allan, J. R., O.L.S. . . . .	Renfrew, Ont.
1892..	1	Anderson, A. G. . . . .	Port Dover, Ont.
1897..	2	Andrewes, E. . . . .	Second Canadian Contingent, South Africa.
1894..	3	Angus, R. W., B.A.Sc., Fellow in Mechanical Engineering . . . . .	School of Practical Science, Toronto.
1888..	1	Apsey, J. F., O.L.S., Resident Engineer Balti- more Belt R.R. . . . .	2125 N. Congress St., Balti- more, Md.
1893..	1	Ardagh, J. A., Engineer . . . . .	Canadian Peat Fuel Co., Toronto.
1895..	1	Armstrong, J., B.A.Sc. . . . .	Can. Northern Ry. Co., Swan River, Man.
1888..	1	Ashbridge, W. T., C.E., Town Engineer . . . . .	Lindsay, Ont.
1896 .	2	Bain, J. W., B.A.Sc., Demonstrator in analytical chemistry . . . . .	School of Practical Science Toronto.
1888..	1	Ball, E. F., A.M. Can. Soc. C.E., Consulting Engineer . . . . .	Buffalo, N.Y.
1893..	4	Ballantyne, H. F., B.A.Sc., Architect. . . . .	20 Nassau St., New York.
1899..	3	Barber, T. . . . .	Georgian Foundry, Meaford, Ont.
1894..	1	Barker, H. F. . . . .	Office Specialty Co., Toronto.
1891..	1	Beatty, H. J., O.L.S. . . . .	Egansville.
1894..	3	Beauregard, A. T., B.A.Sc., Erecting Engineer.	New England Engineering Company, Waterbury, Conn.
1894..	1	Bergey, A. E. . . . .	Riter & Conley, Alleghany, Pa.
1895..	3	Blackwood, A. E., Manager N.Y. Office . . . . .	Sullivan Machinery Co., New York.
1885..	1	Bleakley, F. W. . . . .	Room 46, Sullivan Block, Seattle, W.T.
1895..	1	Boswell, E. J., O.L.S., Assistant Engineer. . . . .	Crow's Nest Pass R.Y., Leth- bridge, B.C.
1890..	5	Boustead, W. E., B.A.Sc., deceased.	
1897..	2	Bow, J. A., Inspector of Mines for Rainy River and Thunder Bay . . . . .	R Portage, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1886..	1	Bowman, A. M., C. E., D. & O.L.S., Assistant Engineer Ohio River Improvement .....	Bellevue, Pa.
1890..	1	Bowman, F. M., C.E., O.L.S., Chief Engineer..	Riter & Conley, Alleghany, Pa.
1885..	1	Bowman, H. J., D. & O.L.S., M. Can. Soc. C.E., (County Clerk and Treasurer) .....	Berlin, Ont.
1894..	3	Boyd, D. G., Inspector of Mines .....	Michipicoten, Ont.
1898..	2	Boyd, W. H., B.A.Sc. ....	Geological Survey, Ottawa.
1895..	2	Brebner, G. ....	General Electrical Co., Schenectady, N.Y.
1895..	3	Brodie, W. M., B.A.Sc., Manager.....	Pendrith & Co., Toronto, Ont.
1888..	1	Brown, D. B. O.L.S. ....	Ferrocarril de Cabello Blanco —Cuidad de Guatemala, Guatemala.
1893..	1	Brown, G. L., O.L.S., Town Engineer. ....	Morrisburg, Ont.
1895..	3	Brown, L. L., Locomotive Dept. ....	N. Y., N. H. & H. Ry., New Haven, Conn.
1890..	1	Bucke, M. A., M.E., deceased.	
1894..	3	Bucke, W. A., B.A.Sc., Engineer.....	Royal Electric Co., Montreal, P.Q.
1883..	1	Burns, D., O.L.S., A.M. Can. Soc. C.E. ....	Keystone Bridge Co., Pittsburgh, Pa.
1887..	1	Burns, J. C., deceased.	
1899..	2	Burnside, T., (Post graduate course) .....	School of Practical Science, Toronto.
1896..	2	Burwash, L. T., Mining Recorder, Timber and Crown Lands Agent .....	Stewart River P.O., Yukon.
1896..	3	Campbell, G. M. ....	Westinghouse Electric Mfg. Co., East Pittsburgh, Pa.
1895..	4	Campbell, R. J. ....	Chicago Tribune, Chicago, Ill.
1888..	1	Canniff, C. M. ....	Luxfer Prism Co., Toronto, Ont.
1889..	1	Carey, B. ....	Engineer's Office, Toronto.
1897..	1	Carpenter, H. S., B.A.Sc., O.L.S., Town Engineer .....	Collingwood, Ont.
1898..	2	Carter, W. E. H., B.A.Sc., Assayer. ....	Yellow Stone Mine, Saluro, B.C.
1894..	1	Chalmers, J., O.L.S., Assistant Engineer .....	Ont. & R. R. Ry., Port Arthur.
1889..	1	Chalmers, W. J., Assistant Engineer, Ohio River Improvement .....	Vanport, Pa.



GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1893..	1	Charlesworth, L. C., O.L.S., Mining Lands Agent	Rat Portage, Ont.
1897..	5	Charlton, H. W., B.A.Sc., Assistant Analyst	Experimental Farm, Ottawa.
1888..	1	Chewett, H. J., B.A.Sc., Am. Can. Soc. C.E., Civil and Mining Engineer	83½ York St., Toronto.
1899..	3	Chubbuck, L. B., (Post graduate course)	School of Practical Science, Toronto.
1889..	1	Clement, W. A., A.M., Can. Soc. C.E., Road- ways Engineer	City Engineer's Office, Tor- onto, Ont.
1899..	2	Clothier, G. A.	Mining Records Office, Ross- land, B.C.
1895..	3	Connor, A. W., B.A., Draftsman	Hamilton Bridge Co., Hamil- ton, Ont.
1899..	1	Cooper, C.	Carlyle, Assa.
1890..	1	Corrigan, G. D., deceased.	
1899..	2	Coulthard, R. W., (Post graduate course)	School of Practical Science, Toronto.
1899..	3	Craig J. A.	Toronto Street Railway, Tor- onto.
1898	3	Darling, E. H., Draftsman	Hamilton Bridge Works, Hamilton, Ont.
1891..	1	Deacon, T. R., O.L.S., Managing Director	Mikado Gold Mining Co., Rat Portage, Ont.
1896..	2	De Cew, J. A.	T. H. De Cew & Sons, Manu- facturers, Fenelon Falls, Ont.
1891..	1	Dill, C. W., Assistant City Engineer	Rossland, B.C.
1895..	1	Dobie, J. S., B.A.Sc., O.L.S., Mining Engineer	Port Arthur.
1890..	1	Duff, J. A., B.A., A.M. Can. Soc. C.E., Lecturer in Applied Mechanics	School of Practical Science, Toronto.
1883	1	Duggan, G. H., M. Can. Soc. C.E., Chief Engi- neer	Dominion Bridge Co., Mont- real, P.Q.
1893..	1	Dunn, T. H.	Morrisburg, Ont.
1899	2	Elliott, J. C.	Mother Lode Mine, B.C.
1896..	3	Elliott, H. P., B.A.Sc.	Westinghouse Electric Co., East Pittsburgh, Pa.
1890..	1	English, A. B.	Toronto.
1894..	4	Ewart, J. A., B.A.Sc., Architect	Arnoldi & Ewart, Architect, Ottawa, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1893..	1	Fairbairn, J. M. R., O.L.S .....	Greenwood, B.C.
1892..	1	Fairchild, C., O.L.S., Assistant Engineer .....	Exploration Survey McKenzie Basin.
1893..	4	Fingland, W., Architect .....	307 W. 119th St., New York.
1899..	3	Foreman, W. E. ....	General Electric Co., Schynectady, N.Y.
1893..	1	Forester, O. ....	Toronto, Ont.
1897..	4	Forward, E. A., Assistant Engineer.....	Cornwall Canal, Dickinson's Landing.
1893..	1	Francis, W. J., A.M., Can. Soc. C. E., Assistant Engineer .....	Staff of Trent Canal, P.O. Box 228, Peterboro', Ont.
1890..	1	Garland, N. L .....	Eglington, Ont.
1888..	1	Gibbons, J., D. & O.L.S .....	Alaska Boundary Survey, Department of the Interior, Ottawa, Ont.
1893..	3	Goldie, A. R., Manager.....	Goldie & McCulloch Co., Ltd., Galt, Ont.
1892..	1	Goodwin, J. B., B.A.Sc., Assistant Engineer...	Niagara Falls Power Co., Niagara Falls, N.Y.
1898..	1	Grant, W. F., B.A.Sc.....	W. F. Grant & Co., Contractors, 50 Front St. E.
1897..	3	Gray, A. T., B.A.Sc.....	General Electric Co., Schynectady, N.Y.
1895..	1	Guernsey, F.W., Engineer .....	Neepawa Gold Mining Co., Wabigoon.
1896..	3	Gurney, W. C., Chief Engineer.....	Steam and Hot Water Heating Department Gurney Foundry Co., Toronto. Ont.
1899..	3	Guy, E. ....	General Electric Co., Schynectady, N.Y.
1896..	3	Haight, H. V., B.A.Sc., Engineer.....	Canadian Rand Drill Co., Sherbrooke, Que.
1893..	3	Hanby, S. C.....	Midland, Ont.
1889..	1	Hanning, G. F .....	City Engineer's Office, Toronto.
1899..	3	Hare, W. A. (Post Graduate Course).....	School of Practical Science, Toronto.
1895..	4	Harkness, A.H., B.A.Sc., Fellow in Civil Engineering.....	School of Practical Science, Toronto.
1889..	1	Haultain, H. E. T., Mining Engineer, Manager.	Yellowstone Mine, Salmo, B.C.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1885..	1	Henderson, E. E., O.L.S.....	Henderson P. O., Piscati- quois, Me.
1894..	3	Herald, W. J., B.A.Sc .....	Cambria Steel Works, Johns- town, Pa.
1896..	1	Hermon, E. B., D. & O.L.S.....	Garden, Hermon & Burwell, Vancouver, B.C.
1897..	3	Hicks, W. A. B. ....	Northey Mfg. Co., Toronto, Ont.
1895..	3	Hull, H. S., B.A.Sc., Draftsman .....	Penusylvania Ry., Wilming- ton, Del.
1890..	1	Hutcheon, J., O.L.S., City Engineer .....	Guelph, Ont.
1899..	1	Innes, W. L., O.L.S., C.E. ....	Simcoe, Ont.
1889..	1	Irvine, J. ....	Harriston, Ont.
1889..	1	James, D. D., B.A., B.A.Sc., O.L.S.....	Rat Portage, Ont.
1891..	5	James, OS., B.A.Sc., Analytical Chemist .....	75 Adelaide E., Toronto.
1882..	1	Jeffrey, D .....	Contractor, Stratford, Ont.
1894..		Job, H. E., B.A.Sc., Manager .....	Kay Electric Co., Hamilton, Ont.
1894..	1	Johnson, S. M., B.A.Sc., O.L.S., Engineer.....	Johnson & McAllister, Green- wood, B.C.
1894..	3	Johnston, Arthur C., B.A.Sc., Mechanical Engi- neer .....	Loraine Steel Co., Loraine, Ohio.
1894..	1	Jones, J. E., Draftsman .....	Carnegie Steel Co., Pitts- burg, P.A.
1893..	4	Keele, J., B.A.Sc.....	Geological Survey, Ottawa, Ont.
1882..	1	Kenn dy, J. H., C.E., O.L.S., Consulting Ry. Engineer.....	St. Thomas, Ont.
1897..	4	King, C. F.....	Warren Chemical & Mnfg. Co., 81 Fulton St., N.Y.
1884..	1	Kirkland, W. C .....	Illinois Central Railway, New Orleans, La.
1898..	1	Kormann, T. S., B.A.Sc.....	City Engineer's Office, To- ronto.
1893..	1	Laidlaw, J. T., B. A. Sc., Consulting Mining Engineer. ....	Fort Steele, B.C.
1892..	1	Laing, A. T., B.A.Sc., Demonstrator in Sur- veying. ....	School of Practical Science, Toronto.
1896..	1	Laing, W. F.....	Ontario and Rainy River Railway, Port Arthur.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1886..	1	Laird, R., O.L.S. ....	Reduction Works, Rat Portage.
1891..	1	Lane, A., O.L.S. ....	Barstow, Texas.
1892..	4	Langley, C. E., Architect .....	Langley & Langley, Architects, Toronto.
1892..	1	Laschinger, E. J., B.A.Sc., Assistant Engineer general water system. ....	Consolidated Gold Fields of South Africa, Ltd., Johannesburg, South African Republic.
1893..	3	Lash, F. L., Chief Engineer. ....	Sugar Factory, Boedoeran, Java.
1894..	3	Lash, N. M., Assistant Electrical Engineer ....	Bell Telephone Co., Montreal, Que.
1899..	1	Latham, R., C.P.R. ....	C. P. R., Montreal, P.Q.
1898..	3	Lavrock, J. E. ....	E. Leonard & Sons, London, Ont.
1896..	3	Lawrie, R. R., deceased.	
1892..	5	Lawson, W., B.A.Sc., Chief Chemist .....	Alameda Sugar Co., Alvarado, Cal.
1892..	3	Lea, W. A., B.A.Sc., Mechanical Engineer ..	Mexico St. Railway, Mexico.
1887..	1	Lott, A. E., Railway Construction .....	San Antonio de la Huerta, Mexico.
1885..	1	Ludgate, B.A., O.L.S. ....	Texas Midland Ry., Terrell, Texas.
1893..	1	McAllister, A. L., B.A.Sc., Draftsman .....	New Jersey Steel and Iron Co., Trenton, N.J.
1891..	1	McAllister, J. E., B.A.Sc., C.E. ....	Johnson & McAllister, Trail, B.C.
1893..	1	Macallum, A. F., B.A.Sc. ....	Technical School, Toronto, Ont.
1892..	1	McAree, J., B. A. Sc., D.T.S., O.L.S., Mining Engineer and Surveyor. ....	Pritchard Harbor Copper Mining & Development Co., Rat Portage, Ont.
1896..	3	Macbeth, C., B.A.Sc. ....	London, Ont.
1887..	1	McCullough, A.L., O.L.S., A.M. Can. Soc. C.E.	Civil and Hydraulic Eng., Nelson, B. C.
1888..	1	McDowall, R., O. L. S., A. M. Can. Soc. C. E., Town Engineer. ....	Owen Sound, Ont.
1884..	1	McDougall, J., B.A., County Engineer ....	Court House, Toronto.
1892..	1	McEntee, B., B.A.Sc. ....	Toronto, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1888..	1	McFarlane, G. W., O. L. S., Assistant County Engineer .....	Court House, Toronto.
1893..	1	McFarlen, T. J., Chief Chemist.....	Ferrona Iron Works, Ferrona, N.S.
1895..	3	McGowan, J., B.A., B.A.Sc.....	Technical School, Toronto.
1898..	4	Mackintosh, D .....	Darling & Pearson, Architects, Toronto.
1885..	1	McKay, O., O.L.S., Railway Engineer .....	Windsor, Ont.
1895..	3	McKay, W. N.....	100 Madison ave., Toronto, Ont.
1895..	3	McKinnon, H. L., B.A.Sc.....	Hughes Steam Pump Co., Cleveland, O.
1896..	3	MacMurchy, J. A.....	Westinghouse Machine Co., East Pittsburg, Pa
1898..	1	McNaughton, F. W. ....	Cornwall, Ont.
1893..	1	McPherson, A. J., B. A. Sc., O. L. S., Resident Engineer .....	Smith's Falls Sewerage & Water Works, Brockville, Ont.
1894..	1	McTaggart, A. L., B.A.Sc. ....	Cambria Steel Works, Johnstown, Pa.
1893..	1	Main, W. T.....	Brampton, Ont.
1888..	1	Marani, C. J., General Agent .. .	Canada Permanent and Western Canada Mortgage Corporation, Vancouver, B.C.
1893..	1	Marani, V. G., Assistant Engineer.....	Cleveland Gas, Light and Coke Co., 356 Super or St., Cleveland, O.
1887..	1	Martin, F., O.L.S., M.D. ....	Hospital for Sick Children, Toronto, Ont.
1896..	1	Martin, T., B.A.Sc., Amalgamator.....	Regina Mine.
1895..	1	Meadows, W. W., O.L.S.....	Rat Portage.
1890 { 1891 {	1 & 3	Merrill, E. B., B. A., B. A. Sc., Electrical Engineer.....	425 Church St., Toronto.
1888..	1	Mickle, G. R., B.A., Mining Engineer, Lecturer in Mining .....	School of Practical Science, Toronto.
1889..	1	Mill, F. X., deceased.	
1892..	3	Milne, C. G., B.A.Sc., Chief Draftsman .....	Hamilton Bridge Co., Hamilton, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1893..	1	Mines, W., B.A.Sc .....	Brown Hoisting Co., Cleveland, O.
1894..	4	Minty, W., B.A.Sc., Draftsman.....	28 Albert Drive, Queen's Park, Glasgow, Scotland.
1892..	1	Mitchell, C. H., B.A.Sc., C.E., A.M. Can. Soc. C.E., Hydraulic Engineer ...	Niagara Falls, Ont.
1889..	1	Moberly, H. K., Asst. Mechanical Engineer....	Youghiogheny River Coal Company, Scott Haven, Pa.
1899..	3	Monds, W., (Post graduate course) .....	School of Practical Science, Toronto.
1891..	1	Moore, J. E. A., C.E., Draftsman .....	Wellman-Seaver Engineering Co., Cleveland.
1888..	1	Moore, J. H., O.L.S., Town Engineer.....	Smith's Falls, Ont.
1881..	1	Morris, J. L., C.E., O.L.S., Town Engineer....	Pembroke, Ont.
1891 ..	1	Newman, W., O.L.S., City Engineer .....	Windsor, Ont.
1894..	3	Nicholson, C. J. ....	J. W. Tyrrell, Hamilton, Ont.
1899..	1	Patterson, J. ....	University of Toronto.
1890..	1	Pedder, J. R., O.L.S., deceased.	
1887..	1	Pinhey, C. H., D. & O.L.S., Contractor's Engineer .....	Soulanges Canal, Coteau Landing, P.Q.
1892..	1	Playfair, N. L. ....	131 Isabella Street, Toronto.
1899..	3	Pope, A. S. H. ....	Toronto Electric Light Co.
1892..	1	Prentice, J. M., deceased.	
1897..	1	Proudfoot, H. W. ....	Bonheur, Ont.
1884..	1	Raymer, A. R., Asst. Engineer .....	P. & L. E. Ry., Pittsburg, Pa.
1899..	2	Revell, G. E., (Post graduate course) .....	School of Practical Science, Toronto.
1899..	3	Richards, E., (Post graduate course) .....	School of Practical Science, Toronto.
1888..	1	Richardson, G. H., Divisional Engineer, C.P.R.	Revelstoke, B.C.
1884..	1	Robertson, J., O.L.S.....	Coad & Robertson, Civil Engineers, Surveyors, etc., Glencoe.
1893..	3	Robertson, J. M., Superintendent .....	Power Department The Royal Electric Co., Montreal.
1897..	2	Robinson, A. H. A., B.A.Sc., Fellow in Chemistry	School of Practical Science, Toronto.



GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1895..	1	Robinson, F. J., O.L.S. ....	Barrie, Ont.
1891..	1	Robinson, J. K., deceased.	
1887..	1	Roger, J., O.L.S., Town Engineer .....	Mitchell, Ont.
1894..	1	Rolph, H. ....	Dawson, N.W.T.
1888..	1	Rose, K. ....	Havana, Cuba.
1889..	1	Rosebrugh, T. R., M.A., Lecturer in Electrical Engineering.....	School of Practical Science, Toronto.
1892..	1	Ross, J. A., Chief Draftsman.....	L. S. & M. S. Ry., Cleveland, O.
1888..	1	Ross, J. E., D. & O.L.S., Surveyor.....	Dominion Government, Kamloops, B.C.
1890..	3	Ross, R. A., E. E., Consulting Engineer .....	Montreal, P.Q.
1893..	1	Russel, R., Engineer's Contractor .....	Inverness & Richmond Ry., Port Hood, C.B.
1891..	1	Russell, W. ....	Russell, Poulin & Co., Contractors, Pembroke, Ont.
1899..	3	Saunders, G. A. ....	United Electric Co., Toronto.
1897..	4	Scott, W. F., Draftsman .....	Koken Iron Works, St. Louis, Mo.
1899..	1	Shanks, T., (Post graduate course) .....	School of Practical Science, Toronto.
1898..	1	Shaw, J. H., O.L.S. ....	Pembroke, Ont.
1894..	1	Shields, J. D., B.A.Sc. ....	Rat Portage, Ont.
1896..	3	Shipe, R. R. ....	Shipe Wood Rim Co., 66 Esplanade W., Toronto, Ont.
1898..	3	Shipley, A. E., B.A.Sc. ....	Dominion Iron and Steel Co., Sidney, N.S.
1891..	1	Silvester, G. E., O.L.S., Civil and Mining Engineer .....	De Morest & Silvester, Sudbury, Ont.
1898..	3	Smallpiece, F. C. ....	Can. Gen. Elec. Co., Peterboro.
1897..	3	Smiley, R. N., B.A.Sc. ....	Shelby Steel Tube Co., Cleveland, O.
1892..	1	Smith, Albert .....	Keystone Bridge Co., Pittsburg, Pa.
1894..	1	Smith, Angus, O.L.S., Town Engineer .....	Ridgetown, Ont.
1898..	1	Smith, R. W., P.L.S. ....	Rossland, B.C.

GRADUATES.—*Continued.*

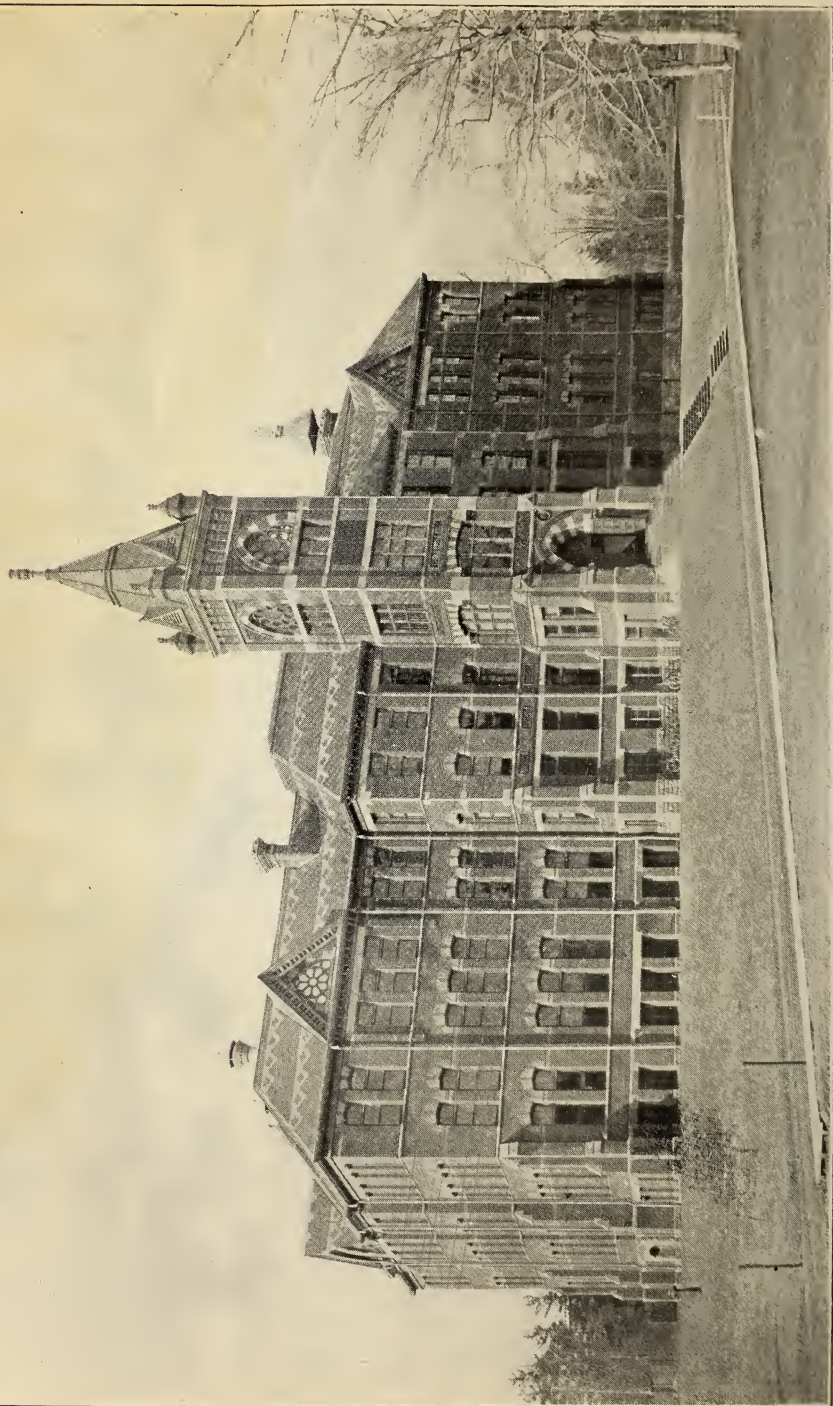
Year.	Dept.	Name.	Address.
1893..	1	Speller, F. N., B.A.Sc., Mining Engineer .....	Can. Bank of Commerce Dawson, N.W.T.
1894..	3	Spotton, A. K., Chief Engineer.....	Jno. Inglis & Sons, Toronto.
1893..	1	Squire, R. H., B.A.Sc., O.L.S. ....	Brant Chambers, Brantford, Ont.
1884..	1	Stern, E. W., Chief Engineer.....	Jackson Architectural Iron Works, New York.
1898..	1	Stewart, J. A., M.A., Draftsman .....	McClintic-Marshall Construc- tion Co Pittsburg, Pa.
1895..	3	Stocking, F. T.....	689 Prospect Avenue Buff- alo, N.Y.
1897..	2	Stull, W. W., B.A.Sc., O.L.S .....	De Morest & Silvester, Sud- bury, Ont.
1891..	1	Symmes, H. D., Manager .....	Port Dalhousie, St.Catharines and Thorold Electric Street Railway, St. Catharines, Ont.
1893..	1	Taylor, W. V., O.L.S., Draftsman.....	C. P. Ry., Winnipeg, Man.
1899..	1	Tennant, D. C., (Post graduate course) .....	School of Practical Science, Toronto.
1892..	1	Thomson, R. W., B.A.Sc., Contractor.....	Box 2608, Johannesburg, South African Republic.
1886..	1	Thomson, T. Kennard, C.E., M. Am. Soc. C.E., Consulting Engineer.....	13-21 Park Row, Building, New York, N.Y.
1895..	3	Tremaine, R. C. C., B.A.Sc., Manager .....	Exeter Electric Ligh & Power Co., Exeter, Ont.
1886..	1	Tyrrell, H. G., C.E., A.M. Can. Soc. C.E. designer	Berlin Iron Bridge Co., East Berlin, Conn.
1883..	1	Tyrrell, J. W., C.E., D. & O.L.S. ....	Dominion Topographical Sur- vey, Ottawa, Ont.
1899..	3	Van Every, W. W .....	Hamilton & Sons, Peterboro', Ont.
1898..	1	Vercoe, H. L., Engineer on Construction .....	Manitoba & Northern Ry., Swan River, Man.
1899..	3	Wagner, W. E., (Post graduate class) .....	School of Practical Science, Toronto.
1893..	1	Watson, R. B .....	Dawson, N.W.T.
1899..	2	Watt, G. H .....	Geological Survey Staff, Ottawa.
1897..	1	Weekes, M. B., B.A.Sc., O.L.S., Fellow Mining Engineering .....	School of Practical Science, Toronto.

GRADUATES.—*Concluded.*

Year.	Dept.	Name.	Address.
1897..	1	Weldon, E. A .....	Ontario & Rainy River Ry., Port Arthur.
1892..	3	White, A. V., Managing Director.....	The Spoke and Specialty Mfg. Co., London, N.W., Eng.
1889	1	Wickett, T., M.D. ....	Watford, Ont.
1898	3	Wilkinson, T. A., Draftsman .....	Niagara Falls Power Co., Niagara Falls, N.Y.
1898..	3	Williamson, D. A., B.A.Sc., Fellow in Electrical Engineering .....	School of Practical Science, Toronto.
1890..	1	Wiggins, T. H., D. & O.L.S., Town Engineer ...	Cornwall, Ont.
1890..	1	Withrow, W. J.....	Luxfer Prism Co., Toronto.
1888..	1	Wright, C. H. C., B.A.Sc., M. Ont. Ass. Archts., Lecturer in Architecture .....	School of Practical Science, Toronto.
1894 ..	3	Wright, R. T., Draftsman.....	Goldie & McCulloch, Galt, Ont.
1899..	3	Yeates, E .....	London Machine Tool Co., London, Ont.







(Frontispiece)

SCHOOL OF PRACTICAL SCIENCE, TORONTO.



CALENDAR

OF THE

Ontario

School of Practical Science.

(Affiliated to the University of Toronto.)

Faculty of Applied Science and Engineering  
of the  
University of Toronto.



Twenty-Fourth Session, 1901-1902,  
TORONTO.

WARWICK BROS  
& RUTTER &



TORONTO.

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# 1901.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..
..	..	..	..	..	..	..

25. Meeting of Council.

27. **Entrance Examinations** begin.

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

1. **FIRST TERM** begins.

1. Vacation work to be handed in.

1. Supplemental Examinations begin.

11. Meeting of Council.

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

8. Meeting of Council.

9. King's Birthday.

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

13. Meeting of Council.

20. **FIRST TERM** ends.

# 1902.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

6. **SECOND TERM** begins.

10. Meeting of Council.

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	..

14. Meeting of Council.

12. Ash Wednesday. Building closed.



# 1902.

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

14. Meeting of Council.  
 21. Annual Meeting of the Engineering Society.  
 28. Good Friday. Building closed.

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

10. Lectures and Practical Work close.  
 11. Meeting of Council.  
 17. **Annual Examinations** begin.  
 22. Thesis for B.A. Sc. to be handed in.  
 22. B.A. Sc. Examinations begin.

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1. **SECOND TERM** ends.  
 5. Meeting of Council.

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

## TIME TABLE—FIRST YEAR.

SESSION 1901-1902.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
8-10	*Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11	*Electricity and Magn'n, 3, 5 (a) Drawing, 1, 2, 4 do 3, 5 (b)	Drawing. *Heat, (c)	Electricity, 3, 5 (b) Drawing, 1, 2, 4 do 3, 5 (a)	Drawing. *Heat, (c)	*Elect'y & Magn'n, 3, 5 (a) Electricity, 3, 5 (b) History of Arch'e, 4 Drawing, 1, 2	10-11
11-12	Drawing, 1, 2, 3, 4 Chemical Lab'y, 5	Chemistry.	Chemistry.	Chemistry.	Pen and Ink, Drawing, 1, 2, 3, 5 4	11-12
12-1	Statics, 1, 2, 3, 4 do 5 (a) Chemical Lab'y, 5 (b)	Dynamics.	Descriptive Geometry.	Surveying, 1, 2, 3, 4 Drawing, 5	Statics, do 1, 2, 3, 4 5 (a)	12-1

# TIME-TABLE.

9

2-3	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, do	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, do Electrical Lab'y, 3, 5 Drawing, do	5 1, 4 (b) 2, 3 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do	5 3, 5 1, 2, 4 (a) 3 1, 2, 4 (b)	2-3
3-4	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, do	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, do Electrical Lab'y, 3, 5 Drawing, do	5 1, 4 (b) 3, 5 2, 3 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do	5 3, 5 1, 2, 4 (a) 3 1, 2, 4 (b)	3-4
4-5	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, do	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, do Electrical Lab'y, 3, 5 Drawing, do	5 1, 4 (b) 3, 5 2, 3 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do	5 3, 5 1, 2, 4 (a) 4 1, 2, 4 (b)	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. (c) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drawing during the hours allotted to Physics.

\*The Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drawing during the remainder of the Session.

TIME TABLE—SECOND YEAR.  
SESSION 1901-1902.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10 Rigid Dynamics, 1, 2, 3 History of Arch'e, 4	Surveying (Lect.), 1, 2, 4 Electricity, 3	*Calculus, 1, 2, 3, 4	*Astronomy, 1 Lithology, 2 (a) Electricity, 3 Drawing, 4.—2 (b)	*Calculus, 1, 2, 3, 4	9-10
10-11 *Optics, (b) Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	*Hydrostatics, (b) Metallurgy, (a)	Descriptive Geom'y, 1, 2, 3, 4	*Hydrostatics, (b) Metallurgy, (a)	*Optics, (b) Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	10-11
11-12 *Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y, 3	*Inorganic Chem'y, 5 Pen and Ink, 4 Drawing, 1, 2, 3	11-12
12-1 Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Strength of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1

2-3	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	Applied Chemistry.	*Physical Lab'y, 3, 5 (a) Orders of Arch'e, 4 Drawing, 1, 2 do 3 (b)	Applied Chemistry.	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 3, 4 (b)	2-3
3-4	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 3, 4 (b)	3-4
4-5	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, History of Ornament, 4	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drawing during the remainder of the Session.

## TIME TABLE—THIRD YEAR.

SESSION 1901-1902.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10 *Biology, Thermodyna- mics, Drawing, 5 1, 2, 3, 4	Hydraulics, 1, 2, 3, 4	Thermodyna- mics, 1, 2, 3 History of Arch't, 4	Hydraulics, 1, 2, 3, 4	*Biology, Compound Stress, 1, 3, 4 Mining and Ore Dressing 2	9-10
10-11 Drawing, 1, 2, 3, 4	Astronomy and Geodesy, Electricity, Drawing, Ore Deposits, Chemical Lab'y, 2 (a) 2 (b)	Mineralogical Lab'y, Assaying, Drawing, 2, 5 (a) 1, 3, 4 2 (b)	Astronomy, Mechanics of Machinery, Principles of Dec'n, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Drawing, 1, 2, 3, 4	10-11
11-12 Drawing, 1, 2, 3 History of Archi- tecture, 4	Constructive Design, do Drawing, Chemical Lab'y, 1, 4 2, 3 (a) 3 (b) 2 (b)	Mineralogical Lab'y, Assaying, Drawing, 2, 5 (a) 1, 3, 4 2 (b)	Constructive Design, do Drawing, Chemical Lab'y, 1, 4 2, 3 (a) 3 (b) 2 (b)	Drawing, 1, 2, 3, 4	11-12
12-1 Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Machine Design 3	Constructive Design, 1, 2, 3, 4 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	Mineralogy and Geology, 1, 2, 4, 5 Machine Design 3	Applied Chemistry	12-1



2-3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2 (b) do 3 (b) Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (b) Metallurgy, 1, 4 (b) Drawing, 1, 4 (b)	Descriptive Geometry, 1, 2, 3, 4 (a) Theory of Least Squares, 1, 2, 3 (b) Drawing, 1, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 2, 5 (b) Metallurgy, 1, 4 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do 1, 4 (b) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3 (b)	2-5
3-4	*Physical Lab'y, 3 (a) *Organic Chemistry, 5 Drawing, 1, 2, 3 (b) do 3 (b)	*Organic Chemistry, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (b) Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3 (a) do 4 (a) Chem. Lab'y, 2 (b) Pen and Ink, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 2 (b) Assaying, 1, 4 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do 1, 4 (b) Chemical Lab'y, 2 (b) Organic Chemistry, 5 Field Work, 1, 2, 4 (b) Drawing, 3 (b)	3-4
4-5	*Physical Lab'y, 3, 5 (a) Surveying 1, 2, 4 (a) (Lect.) 1, 2, 3, 4 (b) Drawing, 1, 2, 3, 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 (b) Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 (a) Chem. Lab'y, 2 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 2 (b) Assaying, 1, 4 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do 1, 4 (b) Chemical Lab'y, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 3 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry ; \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are in common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drawing during the remainder of the Session.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such intervals as suit the laboratory work.

**FACULTY OF THE SCHOOL.**

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**PRINCIPAL :**

J. GALBRAITH, M.A., M. Can. Soc. C. E.

**MEMBERS OF THE COUNCIL :**

J. GALBRAITH, M.A., M. Can. Soc. C. E.  
Professor of Engineering (Chairman).

W. HODGSON ELLIS, M.A., M.B.,  
Professor of Applied Chemistry.

A. P. COLEMAN, M.A., Ph.D.,  
Professor of Assaying and Metallurgy.

L. B. STEWART, O.L.S., D.T.S.,  
Professor of Surveying and Geodesy (Bursar).

C. H. C. WRIGHT, B.A.Sc., Mem. O.A.A.,  
Professor of Architecture.

T. R. ROSEBRUGH, M.A.,  
Professor of Electrical Engineering.

J. A. DUFF, B.A., A. M. Can. Soc. C. E.,  
Lecturer in Applied Mechanics.

G. R. MICKLE, B.A.,  
Lecturer in Mining.

R. W. ANGUS, B.A. Sc.,  
Lecturer in Mechanical Engineering.

A. T. LAING, B.A.Sc.,  
Demonstrator in Surveying (Secretary).

J. W. BAIN, B.A.Sc.,  
Demonstrator in Analytical Chemistry.

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Demonstrator in Mechanical Engineering.

**ASSISTANT INSTRUCTORS :**

W. MONDS, B.A.Sc.,  
Fellow in Mechanical Engineering.

A. H. HARKNESS, B.A.Sc.,  
Fellow in Applied Mechanics.

## FACULTY.

### ASSISTANT INSTRUCTORS.—*Continued.*

M. B. WEEKES, B.A.Sc.  
Fellow in Mining Engineering.

A. H. A. ROBINSON, B.A.Sc.,  
Fellow in Chemistry.

F. C. SMALLPEICE, Grad. S.P.S.,  
Fellow in Electrical Engineering.

J. T. M. BURNSIDE, B.A.Sc.,  
Fellow in Civil Engineering.

---

Lecture Assistant in Chemistry.

### MEMBERS OF THE FACULTY OF ARTS

whose classes are attended by the Regular Students of the School:

JAMES LOUDON, M.A., L.L.D.,  
President and Professor of Physics.

R. RAMSAY WRIGHT, M.A., B.Sc.,  
Professor of Biology.

ALFRED BAKER, M.A.,  
Professor of Mathematics.

W. R. LANG, D.Sc.,  
Professor of Chemistry.

A. B. MCCALLUM, B.A., M.B., Ph.D.,  
Associate Professor of Physiology,

W. L. MILLER, B.A., Ph.D.,  
Associate Professor of Physical Chemistry.

W. J. LOUDON, B.A.,  
Demonstrator in Physics.

C. A. CHANT, M.A.,  
Lecturer in Physics.

J. C. MCLENNAN, B.A., Ph.D.,  
Demonstrator in Physics.

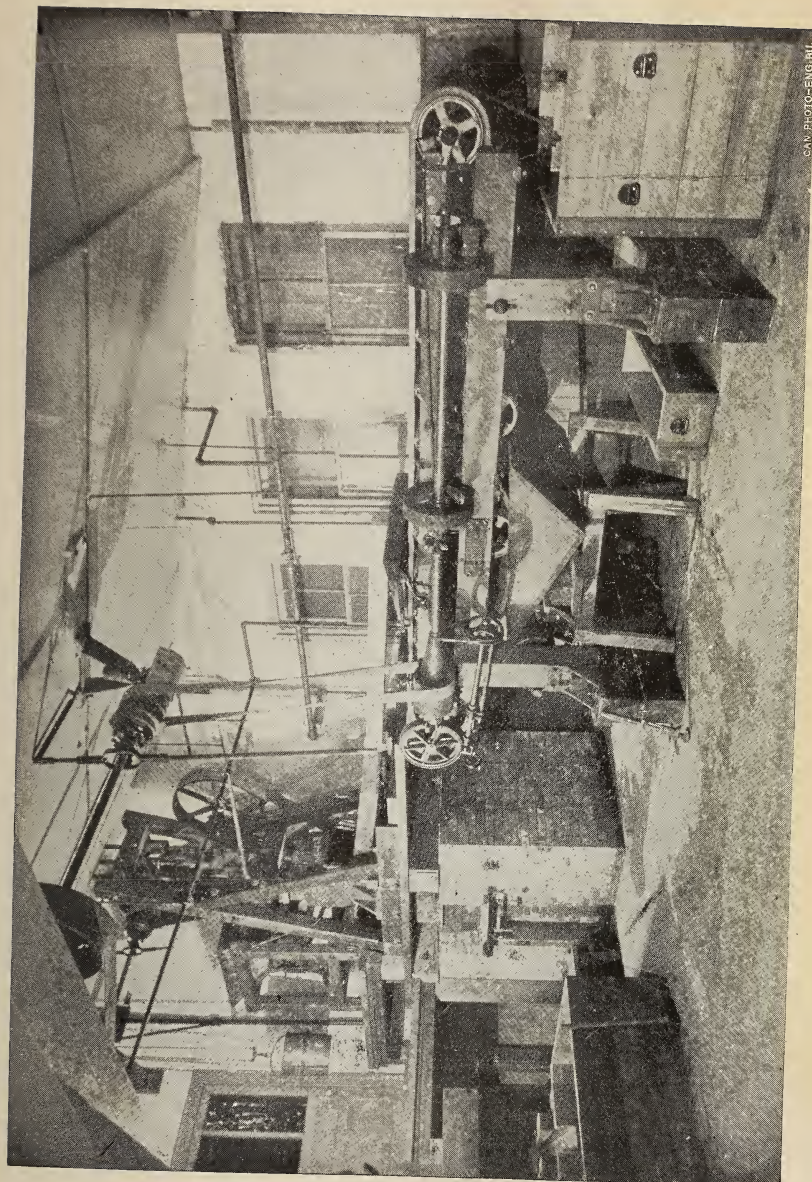
ALFRED T. DELURY, B.A.,  
Lecturer in Mathematics.

J. MCGOWAN, B.A., B.A.Sc.,  
Fellow in Mathematics.

G. R. ANDERSON, M.A., and J. S. PLASKETT, B.A.,  
Assistants in Physics.

For the Calendar or other information, address the Secretary,  
A. T. LAING.





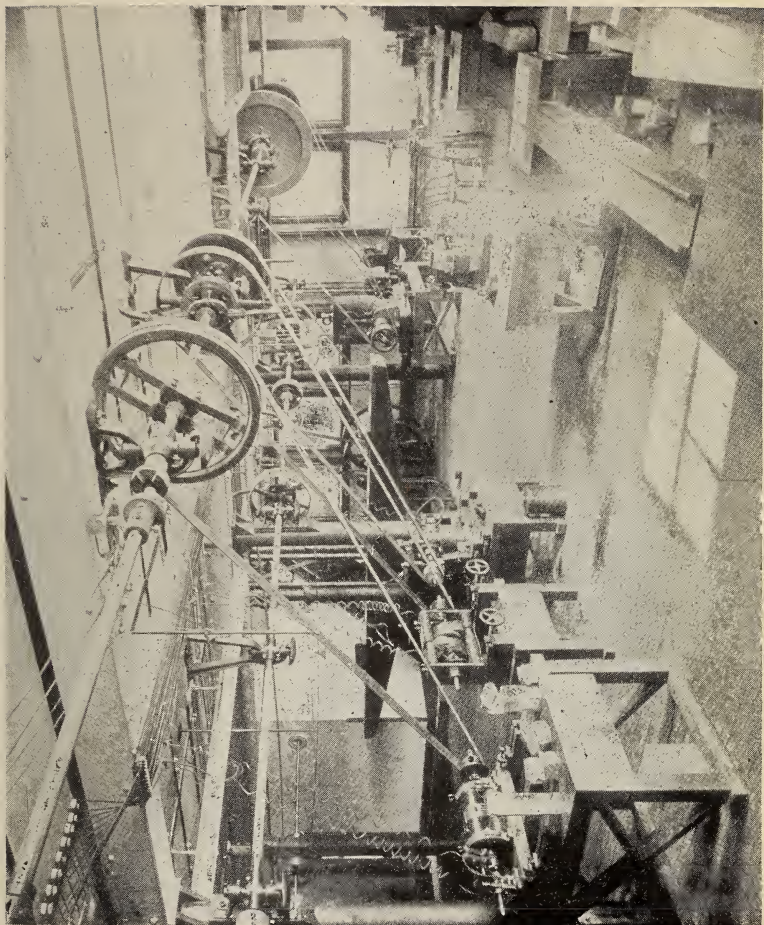
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DYNAMO ROOM.



# SCHOOL OF PRACTICAL SCIENCE.

PROVINCE OF ONTARIO.

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## CALENDAR FOR THE SESSION 1901-1902.

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THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments in science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was

entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz. :—

1. Civil Engineering (including Sanitary Engineering.)
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

#### DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

#### THE DEGREE OF B. A. Sc.

After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this

list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

#### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), or Electrical Engineer (E. E.), as the case may be, subject to the rules and regulations established by the University.

#### FACULTY OF APPLIED SCIENCE AND ENGINEERING.

By a statute of the Senate of the University of Toronto, passed on December 14th, 1900, the teaching staff and examiners of the School of Practical Science, together with the examiners for the degree of B. A. Sc. and professional degrees in Engineering, were constituted *ex officio* the Faculty of Applied Science and Engineering of the University of Toronto.

The statute is as follows :—

By the Senate of the University of Toronto,  
*Be it enacted :*

1. That the Faculty of Applied Science and Engineering be hereby established.
2. That the courses and examinations of the School of Practical Science leading to the diploma of the school and



to the special certificates of the school, together with the courses and examinations leading to the degrees of Bachelor of Applied Science (B. A. Sc.), Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), and Electrical Engineer (E. E.), be the curriculum and examinations of the University in the said faculty.

3. That the members of the teaching staff of the School of Practical Science be the members of the teaching staff of the University in the said faculty.

4. That the examiners for the School of Practical Science, whether members of the teaching staff of the said school or otherwise, together with the examiners for the degrees named in clause 2, be the examiners of the University in the said faculty.

5. That the regular students of the School of Practical Science in the first, second, third and fourth years respectively be the undergraduates of the University in the corresponding years in the said faculty.

6. That the non-regular, occasional and special students of the School of Practical Science be the non-regular, occasional and special students of the University in the said faculty.

7. That the provisions of this statute apply, as far as may be, to all graduates of the School of Practical Science and to all graduates of the University in Applied Science and Engineering.

8. That no liability shall be incurred by the University of Toronto for the support or maintenance of the faculty hereby established.

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REGULATIONS

RESPECTING THE

School of Practical Science,

Approved by Colonel Sir Casimir Stanislaus Gzowski, K. C. M. G.,  
Administrator of the Government of the Province of Ontario, the  
30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.
2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this vacation shall be determined annually by the Council.
3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :
  - (1) Civil Engineering (including Sanitary Engineering.)
  - (2) Mining Engineering.
  - (3) Mechanical and Electrical Engineering.
  - (4) Architecture.
  - (5) Analytical and Applied Chemistry.
4. The Regular Course for the Diploma of the School in each Department shall be three years.

5. Students may enter the Regular Course in any of the above Departments, either (*a*) by presenting certificates of having passed the Matriculation Examination in any University in His Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (*b*) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects:

*Arithmetic.*—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

*Algebra.*—Elementary rules, easy factoring, highest common measure, lowest common multiple, square root, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

*Euclid.*—Books I., II., and III; deductions.

*English.* Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.
7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.
8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.

9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.
10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.

#### ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, p. .

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (b) order in Council, p. .

This examination will begin at 9 a.m., Friday, September 27th, 1901.

Candidates are required to give the Secretary at least two weeks' notice in writing of their intention to take this examination.

## REGULAR COURSES FOR THE DIPLOMA.

See regulations pp.      and      .

The following are the Departments in which the Diploma is granted :—

- (1) Civil Engineering (including Sanitary Engineering).
- (2) Mining Engineering.
- (3) Mechanical and Electrical Engineering.
- (4) Architecture.
- (5) Analytical and Applied Chemistry.

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

YEAR	DESCRIPTION OF PAYMENT	1.	2.	3.	4.	5.
		Civil Engineering	Mining Engineering	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
I.	Payable in First Term—					
	Sessional Fees.....	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Physical Laboratory....			1 00		1 00
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory					
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees.....	35 00	35 00	35 00	35 00	35 00
	Total.....	75 00	75 00	76 00	75 00	76 00

YEAR	DESCRIPTION OF PAYMENT	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering.	4. Architecture,	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	c.
II.	Payable in First Term—					
	Sessional Fees.....	39 00	39 00	39 00	39 00	39 00
	Dues—					
	Physical Laboratory....	1 50	1 50	1 50	1 00	1 50
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 50	49 50	46 50	46 00	49 50
	Payable in Second Term—					
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00
	Total.....	89 50	89 50	86 50	86 50	89 50
II.	Payable in First Term—					
	Sessional Fees.....	44 00	44 00	44 00	44 00	44 00
	Dues—					
	Physical Laboratory....	1 00	.....	3 00	2 00	3 00
	Library... ..	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General... ..	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	.....	3 00	.....	.....	3 00
	Mineralogical Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	50 00	49 00	56 00
	Payable in Second Term—					
	Sessional Fees.....	45 00	45 00	45 00	45 00	45 00
	Total. ....	93 00	98 00	95 00	94 00	101 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows :

Payable in First Term—

Sessional Fees.....	\$35 00
Dues, Library.....	1 00
Deposits, General.....	2 00

Payable in Second Term—

Sessional Fees.....	34 00
University Fees.....	20 00

Total .....	\$92 00
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Fourth year students must also pay the deposits of the laboratories in which they work.

OCCASIONAL STUDENTS.—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library due, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

CERTIFICATES.—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Analytical and Applied Chemistry, Lecture Assistant in Chemistry.

Each fellowship is of the value of \$500 per annum.



The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September.

#### REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in October, notice in writing of their intention to take such examinations.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in drawing the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper  $15 \times 22$  inches, unless otherwise prescribed.

The Council reserve the right of disposing of the drawing as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

#### **Vacation Work.**

Vacation work must be handed in on or before October 1st, 1901.

Vacation notes must be on construction only, and contain not less than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not less than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

### **Supplemental Examinations, Etc.**

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the first day of the session. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or thesis indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time table

#### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, except under such circumstances as may be deemed sufficient by the Council. Application for exemption must be made in writing and the particulars of the case fully stated.

#### PRIZE.

The following prize has been established ;

Civil Engineering, 3rd Year, \$10 in books. Donor—  
Mr. T. Kennard Thomson, C. E., New York.

#### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS.

(APPROXIMATE LIST.)

## 1 Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Statics.
Euclid.	Dynamics.
Plane Trigonometry.	Descriptive Geometry.
Analytical Geometry 1,2,3,4.	Surveying ..... 1,2,3,4.
History of Architecture. .4.	Chemistry, Elementary.
Magnetism and Electric- ity.....3,5.	Electricity.... 3,5. Heat.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes ..... 1, 2, 4.
Architectural Sketches .. .4.
Experimental Physics..... 3,5.
Practical Electricity.....3,5.
Practical Chemistry.
Practical Mineralogy .... 1, 2, 5.
French and German..... .5.

## 11 Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus ..... 1,2,3,4.	Strength of Materials. 1,2,3,4
Astronomy .. .....1.	Rigid Dynamics.. . 1, 2, 3.
Optics.	Theory of Mechanism ....3.
Hydrostatics.	Descriptive Geometry.....
History of Architecture...4.	..... 1,2,3,4.
Orders of Architecture...4.	Surveying ..... 1, 2, 4.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

History of Ornament....4.	Spherical Trigonometry....
Chemistry, Inorganic and .....	.....1,2,3.
Physical ... ..5.	Mineralogy and Geology...
Chemistry, Applied. ....	.....1,2,4,5.
Electricity .....3,5.	Lithology ... ..2.
	Metallurgy.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.....	1,2,3,4.
Field Notes.....	1,2.
Construction Notes.....	1,2,3,4.
Architectural Sketches.....	4.
Experimental Physics	
Electricity, Practical .....	3.
Thesis (at beginning of session.)	
Chemistry, Practical.	
Mineralogy, Practical.....	1,2,5.
French and German.....	5.

## 111 Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity.3.	Theory of Construction ....
History of Architecture....4.	.....1,2,3,4
History of Ornament....4.	Mechanics of Machinery..3.
Principles of Decoration..4.	Machine Design.....3.
Elements of Design .....4.	Hydraulics .....1,2,3,4.
Method of Least Squares..	Thermodynamics ....1,2,3.
.....1,2,3.	Descriptive Geometry.....
Chemistry, Inorganic and .....	.....1,2,3,4.
Organic.....5.	Practical Astronomy and
Chemistry, applied.	Geodesy .....1.
Mineralogy and Geology	Surveying and Levelling
.....1,2,4,5.	.....1,2.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering,               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry, |   |





*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
\_\_\_\_\_ has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

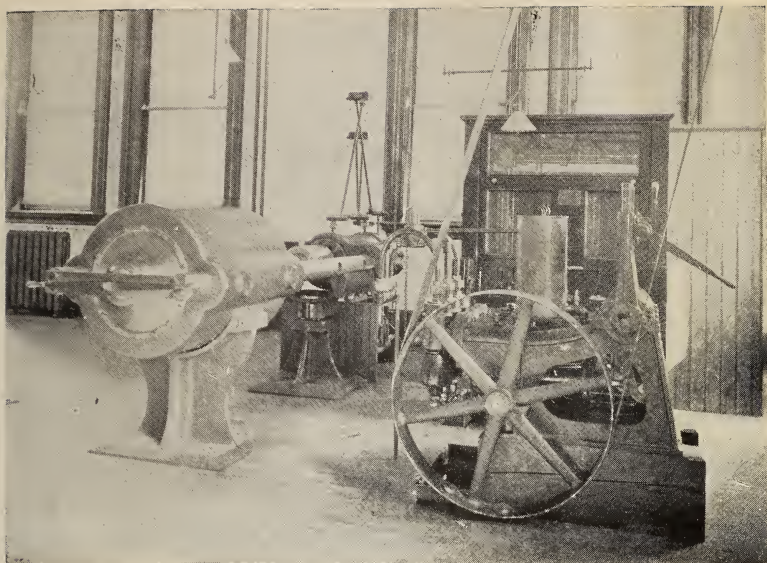
*Wherefore the said \_\_\_\_\_  
becomes duly intitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School all the requirements  
thereunto relating.*

*In witness whereof we have signed this Diploma at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred and \_\_\_\_\_  
and have caused the Seal of this School to be hereunto affixed*

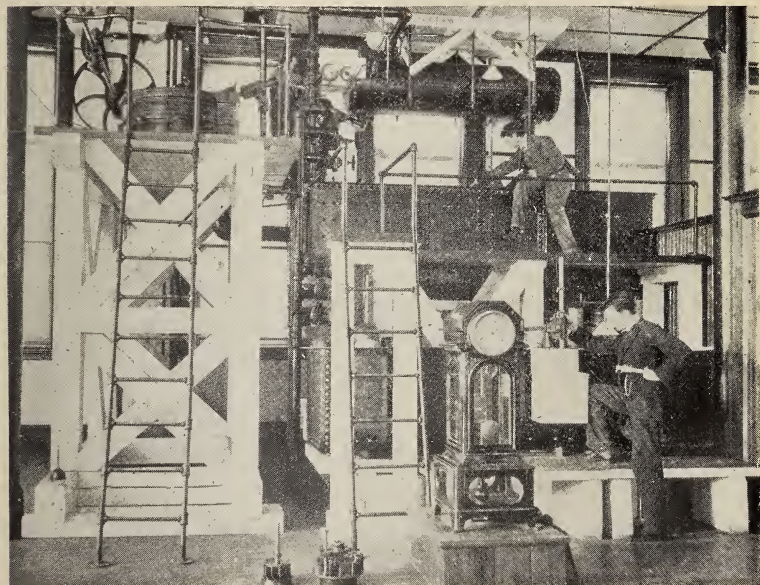
\_\_\_\_\_  
*Chairman.*

\_\_\_\_\_  
*Secretary*





EMERY TESTING MACHINE.



HYDRAULIC PLANT.



Sanitary Plumbing, Heating and Ventilation	4.	Metallurgy	.....2, 5.
Theory of Compound Stress		Mining and Ore Dressing	..2.
..... I, 3, 4.		Ore Deposits	..... 2.
		Assaying	..... ..2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing	..... I, 2, 3, 4.
Field Notes	.... .. I, 2.
Construction Notes	... .. I, 2, 3, 4.
Architectural Sketches	..... 4.
Experimental Physics	.... I, 3, 4, 5.
Electricity, Practical	.... .. 3.
Thesis (at beginning of session.)	
Chemistry, Practical	..... .. 2, 5.
Mineralogy, Determinative	.... 2, 5.
Assaying	..... .. 2, 5.

## DEPARTMENT OF CIVIL ENGINEERING.

(INCLUDING SANITARY ENGINEERING.)

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers (including under this term Sanitary Engineers).

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

#### CHEMISTRY

General principles of chemistry,

Elementary chemistry.

Laboratory practice.

#### MINERALOGY.

Introductory course.

#### PHYSICS.

Heat.

#### MECHANICS.

Statics and dynamics (with special reference to structures and machines).

#### SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

### II Year.

#### MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

#### DRAWING.

Subjects of first year continued.

Coloring and shading applied in both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes).



CHEMISTRY.

Advanced chemistry.  
Thermo-chemistry.  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)  
Strength and elasticity of materials.  
Experimental work in engineering laboratory.  
Transit-theodolite surveying.  
Levelling.  
Railway location curves, etc.  
Hydrographic surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.  
Blowpipe practice.  
Determination of minerals.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages        and        .

III Year.

DRAWING.

Subjects of previous years continued.  
Descriptive geometry — shades and shadows,  
stone cutting, perspective projection.  
Original designs—bridges, roofs, floors, arches,  
etc.

## CHEMISTRY (Applied).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics pure and applied).  
Strength and elasticity of materials.  
Theory of construction.  
Practical designs—bridges, roofs, floors, arches,  
retaining walls, foundations, etc.  
Thermodynamics and theory of the steam engine.  
Hydraulics, sewerage, water supply.  
Experimental work in engineering laboratory.  
Levelling.  
Profiles, cross sections, field work and plotting.  
Computation of quantities.  
Mathematical theory of surveying instruments.  
Trigonometrical and barometrical levelling.  
Geodesy (considering the earth a sphere).  
Practical astronomy (treated in the manner  
required for the O.L.S. and D.L.S examina-  
tions .  
Least squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages      and      .

## II. DEPARTMENT OF MINING ENGINEERING.

This department is designed to afford the necessary preliminary training to students intending to become mining engineers.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographics (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

MINERALOGY.

Introductory course.

PHYSICS.

Heat.

MECHANICS.

Statics and dynamics, (with special reference to structure and machines).

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II. Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction

Machines and structures from both copies and original notes.

#### CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

#### ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Experimental work in engineering laboratory

Transit-theodolite surveying.

Levelling.

Railway location, curves, etc.

Mining surveying.

#### MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

Lithology.

#### METALLURGY.

Iron and steel.

#### PHYSICS.

Hydrostatics.

Optics.

#### EXPERIMENTAL PHYSICS.

Introductory course.

#### VACATION WORK.

See pages      and      .

## III. Year.

## Drawing

Subject of previous years continued

Descriptive geometry

Shades and shadows, stone cutting, perspective projection

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting

Photography

Industrial chemistry

Sanitary chemistry

Laboratory practice

Wet assays

## ENGINEERING AND SURVEYING

Statics and dynamics (pure and applied)

Strength and elasticity of materials.

Theory of construction

Thermodynamics and theory of steam engine

Hydraulics

Experimental work in engineering laboratory.

Levelling.

Profiles, cross-sections, field work and plotting

Computation of quantities

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling

Least squares

## MINERALOGY AND GEOLOGY.

Economic geology

Palæontology

Ore deposits

Blowpipe analysis and determinative mineralogy

Metallurgy of gold, silver, nickel, copper, etc

Mining and ore dressing

Assaying

## VACATION WORK

See pages and

III. DEPARTMENT OF MECHANICAL AND ELECTRICAL  
ENGINEERING.

This department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, graphics.

Descriptive geometry in its application to plane sided solids, orthographical (including isometrical and oblique projection.

## CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

## MECHANICS.

Statics and dynamics (with special reference to structures and machines.)

## SURVEYING.

(Lectures only.) Application of trigonometry and principles of measurement.

## PHYSICS.

Heat.

Magnetism and electricity (introductory course).

Electricity (applications of the laws of Ohm, Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course.



EXPERIMENTAL PHYSICS.

Introductory course.

II. Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere.

Machines and structures. (Drawings made from both copies and original notes.)

CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

Strength and elasticity of materials.

Materials and construction.

Methods and processes.

Experimental work in engineering laboratory.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

Electrical measurements.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages      and      .

### III. Year.

DRAWING.

Subjects of previous year continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

ENGINEERING.

Subjects of previous year continued.

Applied mechanics :

Mechanics of machinery, machine design,  
thermodynamics and theory of the  
steam engine, hydraulics.

Electricity.

Dynamos and motors.

Application of principles to practical problems  
connected with the design, construction and  
testing of various prime motors and machines.

Experimental work in engineering laboratory.

Least squares.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism

## ELECTRICAL LABORATORY.

## ORIGINAL DESIGNS.

Engine and machine design.

## VACATION WORK.

See pages      and      .

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

## IV. DEPARTMENT OF ARCHITECTURE.

This department is designed to afford the necessary preliminary training to students intending to become Architects.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography, graphics.

Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.

Rendering in pencil and pen and ink.

## CHEMISTRY.

General principles of chemistry.  
Elementary chemistry.  
Laboratory practice.

## PHYSICS.

Heat.

## MECHANICS.

Statics (with reference to structures).  
Dynamics (preliminary to the study of hydraulics).

## SURVEYING.

Principles, chain surveying, mensuration.

## HISTORY OF ARCHITECTURE.

General introduction.  
Ancient architecture.  
Egyptian, Assyrian and Persian.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

## DRAWING.

Instrumental drawing, drawing from the cast  
sketching and water color, pen and ink.  
Descriptive geometry (curved surfaces).

## CHEMISTRY.

Advanced chemistry.  
Thermo-chemistry.  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

## MECHANICS.

Statics (pure and applied).  
Strength and elasticity of materials.  
Materials of construction.  
Experimental work in engineering laboratory.

SURVEYING.

Use of transit and level.  
Mensuration.

MINERALOGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

HISTORY OF ARCHITECTURE.

Greek and Roman.  
Romanesque and Byzantine.

ORDERS AND ELEMENTS OF ARCHITECTURE.

HISTORY OF ORNAMENT.

Ancient.  
Classic—Greek, Roman.

VACATION WORK.

See pages      and      .

III Year.

DRAWING.

Descriptive geometry.  
Shades and shadows; stone cutting, perspective  
projection.  
Water color sketching.  
Original designs—floors, trusses, arches, etc.

CHEMISTRY (APPLIED).

Explosives.  
Artificial lighting.  
Photography.  
Industrial Chemistry.  
Sanitary chemistry.

## THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

## HYDRAULICS

## SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

## SURVEYING.

Levelling, setting out excavation, mensuration.

## MINERALOGY AND GEOLOGY.

Economic Geology.

## EXPERIMENTAL PHYSICS.

Heat, acoustics.

## HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

## ELEMENTS OF DESIGN.

Principles of planning with special reference to residences.

Relation between plan and elevations.

## HISTORY OF ORNAMENT.

Early Christian; Gothic and Renaissance.

## PRINCIPLES OF DECORATION.

## VACATION WORK.

See pages      and      .

## V. DEPARTMENT OF ANALYTICAL AND APPLIED CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.



## DRAWING.

Copying from the flat, lettering.

Descriptive Geometry in its application to plane sided solids.

Orthographic (including isometric) and oblique projection.

Model drawing.

## CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

## MINERALOGY.

Introductory course.

## MECHANICS.

Statics and dynamics.

## PHYSICS.

Heat.

Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

Introductory course.

## PRACTICAL ELECTRICITY.

Introductory course.

## II. Year.

## CHEMISTRY.

Inorganic and physical chemistry.

Applied chemistry.

Laboratory work in quantitative and qualitative analysis.

## MINERALOGY AND GEOLOGY.

Elementary mineralogy and blowpipe practice.

\*Physical Geography, palæontology and geology.

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\*An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.

## METALLURGY.

Iron and steel.

## PHYSICS

Hydrostatics.

Optics.

Electricity.

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## MODERN LANGUAGES.

Students in this and the following years are  
expected to be able to read chemical books in  
French and German.

## VACATION WORK.

See pages      and      .

## III. Year.

## CHEMISTRY.

Organic chemistry and chemical physics.

Applied chemistry.

Laboratory work.

## MINERALOGY AND GEOLOGY. .

†Economic geology.

Blowpipe analysis and determinative mineralogy.

## METALLURGY.

Gold, silver, nickel, copper, lead.

## EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

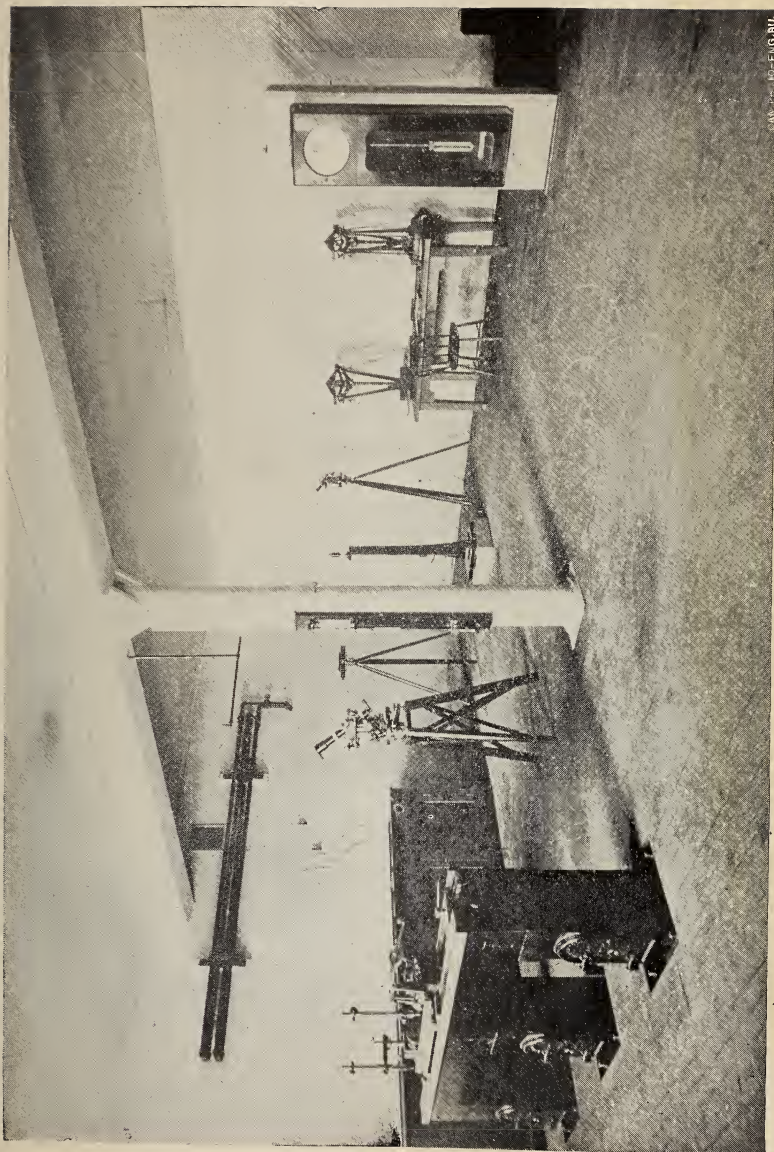
## BIOLOGY.

## VACATION WORK.

See pages      and      .

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† An option is permitted between above subject and Physical  
Chemistry in the University of Toronto.



U.S. GEOLOGICAL SURVEY

CLOCK ROOM.





GALVANOMETER LABORATORY.







## THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of elective and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will

not be allowed to take less than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year.....900

Subdivided as follows :—

Work (reckoned in hours)..... 540 marks

Records (notes, drawings, etc.) . . . . .360 marks

FOR PASS.

The minimum percentages are :

Work, 75 per cent..... 405 marks

Records, 50 per cent..... 180 ,,

And two-thirds of the total marks assigned 600 ,,

## FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done

Honors granted will be mentioned in the certificate required under clause 2 of the statute of the University of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they affect the degree of B. A. Sc.

## DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations ;

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.
3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.
4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.
  - A. { Astronomy.  
Geodesy and Metrology.
  - B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
  - C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.

- D. { Mineralogy and Geology.  
 { Metallurgy and Assaying.

The sub-division "Inorganic and Organic Chemistry" will be obligatory on all candidates who select group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent., of the marks assigned will be required.

5. The degree with honors will be conferred on candidates who obtain three out of the four honors possible, viz :

Certificate with honors.....(cl 2 )

Thesis with honors .....(cl 3 )

Honors in each subject of examination.(cl. 4 )

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in April
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of April.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis, drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

## SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto.

*Be it enacted :*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degrees be hereby established, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.).
- III. That the following be the conditions and regulations governing the conferring of the said degrees.
  1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause II hereunder
  2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree.
  3. Intervals of non-employment or of employment in other branches of engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
  4. Satisfactory evidence shall be submitted to the University Examiners as to the nature and length of the candidate's professional experience for the purposes of clauses 2 and 3.



The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidates may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
  7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the fifteenth day of April.
  8. The candidate shall be required to present himself for examination in the month of April at such time as may be arranged by the Registrar.
  9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
  10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the School of Practical Science.
  11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.
- For further particulars apply to the Registrar of the University of Toronto.

For the better carrying out of the provisions of the above statute the following statute constituting the Board of Examiners for professional degrees in Engineering was passed by the Senate on December 14th, 1900:

By the Senate of the University of Toronto--

*Be it enacted:*

1. That the Examiners for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), and Electrical Engineer (E.E.), be appointed at least twelve months in advance of the date of the examinations for which their services are required.
2. That the said Examiners constitute the Board of Examiners for degrees in Engineering.
3. That the members of the Board shall select one of their number to act as chairman, within one month from the date of their appointment.
4. That candidates for examination applying to the Registrar for information respecting the nature or details of the examinations for the said degrees, shall be directed by him to communicate with the chairman of the said Board, who shall forward to the candidates either directly or through the Registrar the decision of the Board.
5. That the Chairman of the said Board shall keep a record book in which he shall enter the minutes of the proceedings of the Board. He shall also keep a file in book form of all correspondence with candidates for examination and other official correspondence; and shall at the close of the examination transmit to the Registrar a copy of the said minutes and correspondence.

6. That at the close of the examinations the Board shall forward a report of the results to the Registrar for transmission to the Senate. This report shall be signed by the Examiners or by the Chairman of the Board on their behalf.
7. That the Registrar shall furnish each Examiner on his appointment with a copy of this statute and a copy of the statute respecting degrees in Engineering.

**Extract from the Provincial Act Respecting Land Surveyors and  
Survey of Lands. (R.S.O.)**

“10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practicing Ontario Land Surveyor.

14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practicing land surveyor duly filed as required by section 17 of this Act,

during twelve successive months of actual practice after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practicing Ontario Land Surveyor."

**Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners is directed to the facilities afforded for preparation in the School.

**Extract From The Ontario Architects' Act.**

“Any student who has matriculated in Arts in any University in Her Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

“23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

“24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

“(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Registrar upon payment of such fees as the council may by regulation direct.”

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## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

Text-books for the first year marked (*a*) ; second year (*b*) ; third year (*c*) and for fourth or post graduate year (*d*).

### SUBJECTS TAUGHT BY THE FACULTY OF THE SCHOOL.

Subjects.	Instructors.
Organic and Inorganic Chemistry,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           W. H. Ellis, M.A., M.B.,  <span style="display: block; text-align: right;">Professor.</span>           J. W. Bain, B.A.Sc., Demonstrator.            A. H. A. Robinson, B.A.Sc., Fellow.         </div>
Applied Chemistry, Assaying,	
Mineralogy and Geology, Petrography, Metallurgy, Mining and Ore-dressing, Milling, German,	
Statics, Dynamics, Strength of Materials, Theory of Construction. Machine Design, Compound Stress, Hydraulics, Thermodynamics and theory of the Steam Engine, French,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           A. P. Coleman, M.A., Ph., D.,  <span style="display: block; text-align: right;">Professor.</span>           G. R. Mickle, B.A., Lecturer.            M. B. Weekes, B.A.Sc., Fellow.         </div>
Drawing, Architecture, Plumbing, Heating and Ventilation, Mortars and Cements, Brick and Stone Masonry,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           J. Galbraith, Professor.            J. A. Duff, B.A. Lecturer.            R. W. Angus, B.A.Sc., Lecturer.            A. H. Harkness, B.A.Sc., Fellow.            W. Monds, B.A.Sc., Fellow.         </div>
Surveying, Geodesy and Astronomy, Spherical Trigonometry, Least Squares, Descriptive Geometry,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           C. H. C. Wright, B.A.Sc.  <span style="display: block; text-align: right;">Professor.</span>           J. T. M. Burnside, B.A.Sc.,  <span style="display: block; text-align: right;">Fellow.</span> </div>
Electricity, Magnetism, Dynamo-Electric Machinery, Theory of Mechanism, Mechanics of Machinery, Rigid Dynamics.	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           L. B. Stewart, D.T.S., Professor.            A. T. Laing, B.A.Sc.,  <span style="display: block; text-align: right;">Demonstrator.</span> </div>
	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle;">           T. R. Rosebrugh, M.A., Professor.            F. C. Smallpeice, Grad. S.P.S.,  <span style="display: block; text-align: right;">Fellow.</span> </div>



## Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy,	<div style="display: inline-block; vertical-align: middle;">           { Alfred Baker, M.A., Professor.            A. T. DeLury, B.A., Lecturer.            J. McGowan, B.A., B.A.Sc.,              Fellow.         </div>
Sound, Light, Heat. Electricity and Magnetism, Hydrostatics.	<div style="display: inline-block; vertical-align: middle;">           { James Loudon, M.A., L.L.D.,              Professor.            W. J. Loudon, B.A.,              Demonstrator.            C. A. Chant, B.A., Lecturer.            J. C. McLennan, B.A., Ph.D.,              Demonstrator.            G. R. Anderson, M.A., Assistant.            J. S. Plaskett, B.A., Assistant.         </div>

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

## Text Books and Books of Reference.

Angel—Plane and Solid Geometry.

Binn—Orthographic projection.

Church—Descriptive Geometry (*a*), (*b*).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*).

Vere Foster—Copy Book No. 10 (*a*).

Warren—Stone Cutting (*c*).

Worthen—Topographical Drawing

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

- Chain surveys.
- Compass and theodolite surveys.
- Method of keeping field notes.
- Determination of heights and distances.
- Plotting.

## LEVELLING.

- Longitudinal and cross sections
- Plotting.

## SETTING OUT.

- Setting out straight lines and curves.
- Setting out levels.

## MENSURATION.

- Lines, surfaces and solids.
- Timber, masonry, iron and earthwork.
- Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

## Text-Books.

- Brough—Mine Surveying (*b*) (*c*).
- Gillespie Higher Surveying (*b*), (*c*), (*d*).
- Henck or Searle—Railway Curves (*b*), (*c*).
- Johnson—Theory and Practice of Surveying.
- Murray—Manual of Land Surveying (*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

## ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instructions are given in the methods of taking observations.

In geodesy all surveys, computations and methods of map construction are based upon the supposition that the earth is a sphere.

#### ADVANCE COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors. It is distinguished from the work of the ordinary course not so much by the subjects as by the degree of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

#### Text-Books.

Chauvenet - Spherical and Practical Astronomy.

Doolittle - Practical Astronomy.

Gillespie—Higher surveying (*b*), (*c*), (*d*).

Gore - Elements of Geodesy (*c*), (*d*).

Green—Spherical and Practical Astronomy (*c*), (*d*).

Helmert—Höhere Geodäsie.

Nautical Almanac, 1902 (*c*), (*d*).

#### APPLIED MECHANICS.

##### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—  
arches, retaining walls, roofs, bridges, etc.

DYNAMICS.

Representation and measurement of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc. etc.

STRENGTH OF THE PARTS OF MACHINES.

MACHINE DESIGN—

HYDRAULICS.

Discharge of water through orifices, notches, etc.

Flow in pipes, and open channels. Sewerage,  
water-works, water-power, water-wheels  
turbines, pumps, etc.

THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

#### Text-Books and Books of Reference.

Baker—Masonry Construction (*d*).

Billings—Heating and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc., (*d*).

Carnegie—Pocket Companion.

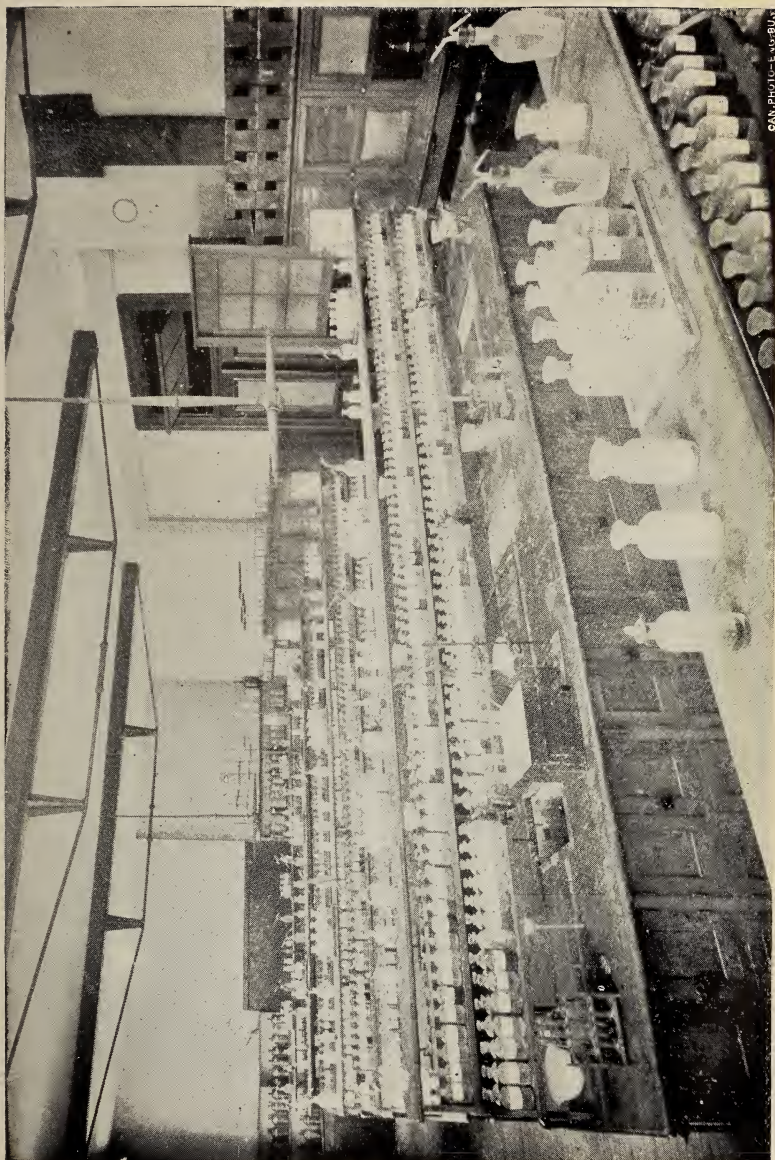
Carpenter—Heating and Ventilation of Buildings (*c*).

“ Experimental Engineering (*d*).

Du Bois—Graphic Statics.

“ Strains in framed Structures.

Gerhard—House Drainage and Sanitary Plumbing. (*c*).



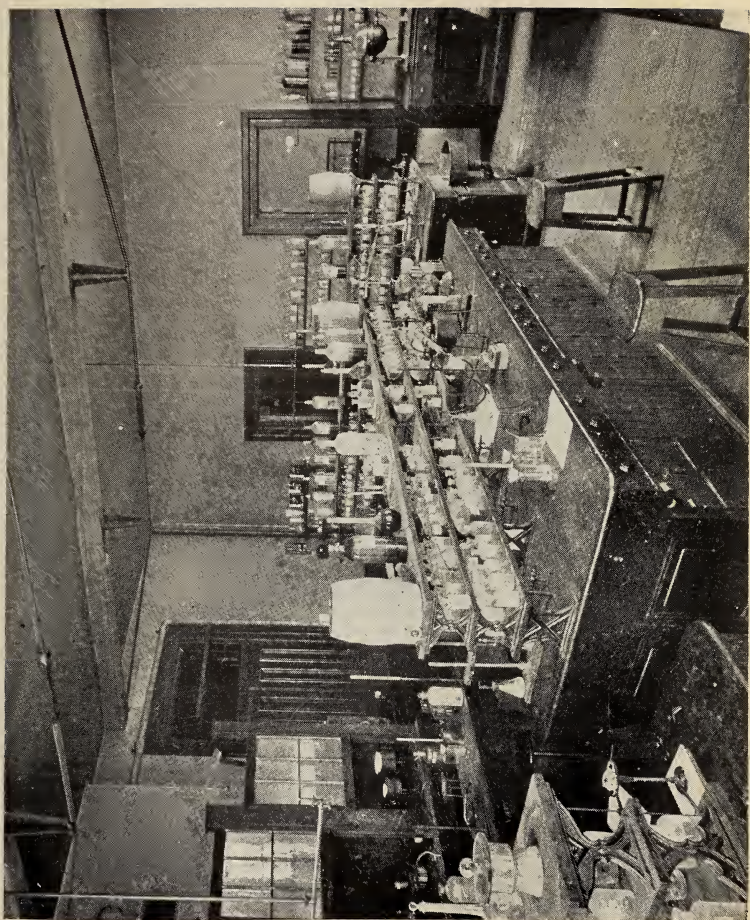
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CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.











Greene—Trusses and Arches.

Innes—Centrifugal Pumps, Turbines and Water Motors  
(*d*).

Johnson—Modern Framed Structures (*c*), (*d*).

“ Materials of Construction (*d*).

Kennedy—Mechanics of Machinery (*b*), (*c*).

Kidder—Building Construction and Superintendence.

“ Architect and Builders' Pocket Book.

Lanza—Applied Mechanics.

Low and Bevis—Machine Drawing and Design (*b*), (*c*).

Low—Machine Drawing (*a*), (*b*), (*c*).

Merriman and Jacoby—Roofs and Bridges.

Merriman—Mechanics of Materials (*b*), (*c*), (*d*).

“ Hydraulics (*c*), (*d*).

Patton—Foundations (*d*).

Peabody—Thermodynamics (*d*).

“ Steam Tables (*d*).

Rafter and Baker—Sewage Disposal in the United  
States.

Rankine—Applied Mechanics (*c*), (*d*).

Reuleaux—The Constructor.

Santo Crimp—Sewage Disposal Works.

Shann—Elementary Treatise on Heat (*c*), (*d*).

Trautwine—Engineer's Pocket Book

Unwin—Elements of Machine Design (*c*).

“ Testing of Materials of Construction.

Von Ott—Graphic Statics (*a*).

Williamson—Elasticity (*d*).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

## Text-Books and Books of Reference.

Auchincloss—Valve and Link Motions (*c*).

Goodeve—Elements of Mechanism (*b*).

Halsey—Side Valve Gears

Kennedy—Mechanics of Machinery (*b*), (*c*).

Rankine—Machinery and Millwork.

Reuleaux—Kinematics of Machinery

## ELECTRICITY.

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University

The work comprises—

ELEMENTARY ELECTRICITY AND MAGNETISM.

MEASURING INSTRUMENTS—

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc

MATHEMATICAL THEORY OF ELECTRICITY.

APPLICATIONS OF ELECTRICITY—

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS

## Text-Books and Books of Reference.

Bedell & Crehore—Alternating Currents.

Carhart & Patterson—Electrical Measurements (*b*), (*d*)

Bedell—Principles of the Transformer (*d*).

Fleming—Alternate Current Transformers, Vols. I and II (*d*)

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe—Electrical Testing (*b*)

Loudon & McLennan—Practical Physics (*b*).

Stewart & Gee —Practical Physics.

Thompson, S P —Elementary Electricity and Magnetism.

“ —Dynamo Electric Machinery.

“ —Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE—

Egyptian, Assyrian and Persian.

Classic

Romanesque and Byzantine.

Gothic.

Renaissance

### ORDERS OF ARCHITECTURE

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

### Text Books and Books of Reference.

Fergusson—History of Architecture.

Fletcher—A History of Architecture.

Gwilt—Encyclopædia of Architecture.

Leeds—Orders of Architecture (*b*).

Osborne—Art of House Planning (*d*).

Owen Jones—Grammar of Ornament.

Racinet—L'Ornament Polychrome

Rickman—Gothic Architecture.

Sharpe—Seven periods of Church Architecture.

Smith, T. Roger—Classic and Early Christian Architecture (*a*), (*b*).



Smith, T. Roger—Gothic and Renaissance (*c*).

Statham—Architecture for General Readers.

Sturgis—European Architecture.

Vignole—The Five Orders of Architecture (*b*), (*c*).

### MATHEMATICS AND PHYSICS.

The Pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

#### Text-books and Books of Reference.

Ganot—Physics (*b*).

Hall & Knight—Plane Trigonometry (*a*).

Loomis—Calculus (*b*).

Loudon & McClennan—Practical Physics (*b*).

Mackay—Elements of Euclid (*a*).

Newcombe & Holden—Astronomy (*b*).

Osborne—Calculus.

C. Smith—Conic Sections (*a*).

Hamblin Smith—Hydrostatics (*b*).

Balfour Stewart—Heat.

Todhunter—Algebra (*a*).

“ —Spherical Trigonometry (*b*).

Tyndall—Sound.

### CHEMISTRY.

#### COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

Elementary chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.



## COURSES IN THE UNIVERSITY OF TORONTO.

Inorganic chemistry.

Organic chemistry.

Chemical theory.

Physical chemistry.

## Text Books and Books of Reference.

Allen—Commercial Organic Analysis.

Arnold—Steel Works Analysis.

Beilstein—Organic Chemistry.

Beringer—Text Book of Assaying.

Blair—Chemical Analysis of Iron and Steel.

Bloxam—Chemistry.

Bloxam &amp; Blount—Chemistry for Engineers and Manufacturers.

Blyth, A. W.—Poisons.

Blyth, A. W.—Foods.

Bolley—Handbuch der Chemischen Technologie.

Dammer—Handbuch der Anorganischen Chemie.

Douglas &amp; Johnson—Qualitative Analysis.

Fresenius—Qualitative and Quantitative Analysis.

Furman—Manual of Practical Assaying.

Jones—Practical Chemistry.

Lehfeldt—Physical Chemistry.

Meyer—History of Chemistry.

Ostwald—Lehrbuch der Allgemeinen Chemie.

Ostwald—Outlines of General Chemistry.

Pattison Muir—Thermo-chemistry, Elements of.

Post—Chemisch-technische Analyse.

Remsen—Inorganic and Organic Chemistry.

Richter—Inorganic and Organic Chemistry.

Roscoe &amp; Schorlemmer—Treatise on Chemistry.

Sadtler—Organic and Applied Chemistry.

Sutton—Volumetric Analysis.

Thorp—Outlines of Industrial Chemistry.

Thorpe—Dictionary of Applied Chemistry.

Thorpe—Quantitative Analysis,  
Wagner—Chemical Technology.  
Walke—Lectures on Explosives.  
Watt—Dictionary of Chemistry.  
Winkler—Gas Analysis.

### MINERALOGY, GEOLOGY AND METALLURGY.

1. Mineralogy and Geology.
  - Mineralogy and crystallography.
  - Geology and palæontology.
  - Petrography.
  - Physical geography.
  - Blowpipe analysis.
  - Determinative mineralogy.
2. Mining and Metallurgy.
  - Mining Geology.
  - Ore dressing,
  - Metallurgy of iron and steel.
  - Metallurgy of nickel, copper, silver, etc.
  - Assaying.
  - Milling.

#### Text-Books and Books of Reference.

Chapman or Brush—Mineral Tables.  
Chapman—Mineralogy and Geology of Canada.  
Crosby—Determination of Minerals.  
Dana—Manual of Geology.  
Furman—Assaying.  
Geikie—Text-Book of Geology.  
Harker—Petrography.  
Howe—Metallurgy of Steel.  
Ihlseng—Manual of Mining.  
Kemp—Handbook of Rocks.  
Kemp—Ore Deposits of the United States.  
Kuhnhardt—Ore Dressing.  
Nicholson—Palæontology.

Peters—Modern Copper Smelting.  
Phillips—Ore Deposits.  
Phillips and Bauerman—Elements of Metallurgy.  
Plattner—Manual of Blowpipe Analysis.  
Roberts-Austen—Metallurgy.  
Rose—Metallurgy of Gold.  
Rosenbusch—Petrography.

## VACATION WORK.

### THESIS AND CONSTRUCTION NOTES.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next following examination.

### CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Country and Suburban Roads.

“ THIRD YEAR.—The Disposal of City  
Wastes—Sewage,  
Garbage, etc.

#### Books of Reference,

Byrne—Highway Construction.  
Shaler—American Highways.  
Spalding—Roads and Pavements.  
Rafter and Baker—Sewage Disposal in the United States.

## MINING ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

## Books of Reference.

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

## MECHANICAL AND ELECTRICAL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-Shop.  
Practice.

“ THIRD YEAR.—Foundry Practice.

## Books of Reference.

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

## ARCHITECTURE.

For the Second year the following set of freehand pencil sketches is required :—

I. Doorway from the object.

II. Staircase “

III. Fireplace with cross section,

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

“ THIRD YEAR.—Twelve water-color studies.

## ANALYTICAL AND APPLIED CHEMISTRY.

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid  
Manufacture.

“ THIRD YEAR.—Manufacture of Chlorine,  
Bleaching Powder and  
Caustic Soda.

**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

**EXCURSIONS.**

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years. The excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

**STEAM ENGINE LABORATORY.**

The equipment of this department is as follows :

A Babcock and Wilcox 52 h. p. boiler.

A Harrison-Wharton 12 h. p. boiler.

A 50 h. p. Brown engine. This engine was constructed specially for experimental investigations. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser the latter of which was kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers. In addition there are the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers, anemometers, thermometers, a platinum and platino-rhodium thermo-couple, etc., etc.

## HYDRAULIC LABORATORY.

This laboratory is equipped with a three-throw pump with double acting cylinders having a capacity of 500,000 gallons per 24 hours. There are also large tanks furnished with orifices and weirs, measuring tanks, etc. A centrifugal pump, a three-foot jet turbine, a nine-inch McCormick, and a six-inch new American Turbine, the latter the gift of the firm of William Kennedy & Sons, Owen Sound, form a part of the same equipment. There are also the usual measuring instruments, gauges, gauge testing apparatus, scales, brakes and dynamometers.

## STRENGTH OF MATERIALS LABORATORY.

The machines in this department are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 10-ton universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity adapted to specimens up to forty eight inches in length.

A Riehle abrasion machine, for testing the resistance to attrition of stones, brick, etc.

Extensometers of the Bauschinger, Unwin, Marshall and other types besides a large number of micrometers and scales.

A shop has been fitted up with a number of high-class machine tools specially fitted for reducing the specimens to



the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs and for making special apparatus for original investigation.

#### CEMENT TESTING LABORATORY.

This department is fitted with all the usual molds, gravimeters tables and tank accommodation necessary in a well equipped laboratory.

In this laboratory there are also the following:

A Riehle 2,000-pounds machine fitted for either tension or compression.

A Riehle 600-pound machine fitted for tension only.

An extra large Faija's hot bath apparatus.

#### METROLOGICAL LABORATORY.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length; a 10-foot Rogers comparator with a graduating attachment; a Kater's pendulum with vacuum chamber; a Howard astronomical clock and electro-chronograph; a Troughton & Simms 10-inch theodolite, eight surveyor's transits, seven levels, compasses, sextants, plane tables, micrometers, planimeters, etc.; and all the necessary field instruments.

#### ELECTRICAL LABORATORY.

In one section of this laboratory a 20 kilo-watt Edison motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, a Westinghouse experimental alternator, and a rotary transformer when used as a polyphase dynamo. Of direct current motors, besides the one already mentioned, there are a Crocker-Wheeler machine and a 6 h.p. Edison motor, used in the mill-room, but available for testing; besides fan motors. Of alternating current

motors the rotary converter may be operated on two or three phase circuits, or may, as a dynamo, supply a three phase induction motor. There are also three smaller alternating current motors, one series, and two "split-phase" motors for different frequencies. A marble switch-board in this room facilitates connection between different circuits, both locally and for other parts of the building. It is supplied with 110 and 220 volts, direct current, and the same voltages of alternating current of 60 cycles from the city circuits, in addition to the range of supply that may be had from the school generators and storage cells. Four switches which may be connected in any of the circuits, two sets of bus-bars for paralleling, automatic circuit breakers, arc and incandescent lamp circuits, and four controlling rheostats are connected, and means are provided for readily connecting measuring instruments in any circuit.

Another section is the galvanometer room in which are ten masonry piers to support instruments in such a way as to be free of vibration.

An adjoining room is the laboratory for advanced work, not yet quite complete, in which may be mentioned a Kelvin Balance and its rheostat, and an enclosure within which experiments with high voltages may be safely performed. Marble switchboards are being placed in this room, and in the galvanometer room to connect with "Chloride" storage batteries of large and small cells located on a gallery in a separate room, and apparatus for convenience in standardizing measuring instruments will be set up here. Among the instruments and apparatus may be mentioned:—Numerous D'Arsonval galvanometers of Carpentier, Rowland and other designs, ballistic galvanometers, a Thomson galvanometer, telescopes and scales, divided microfarad condenser, Kempe discharge key, rheostats and proportional arms for Wheatstone bridge

and other purposes, slide wire metre bridges, including special bridge for electrolytic resistance; standard resistances, including megohm, 10 ohms, several copies of the ohm, divided ohm, one hundredth and one thousandth ohm standards, certified by the Charlottenburg Reichsanstalt, the latter with oil bath and stirrer; Willyoung potentiometer, standard cells, Clark and Helmholtz, Kohlrausch tubes for measurement of electrolytic resistance, Lippmann electrometers, Cascart electrometer, Nernst electrometer. Besides these, are numerous Weston instruments including wattmeter, voltmeters for direct and alternating current, ammeters, and milammeters, Thomson and Whitney ammeters and voltmeters, Siemens electrodynamicometer, Kelvin balance, Kelvin high potential electrostatic voltmeter, and electrostatic multicellular voltmeter; Thomson recording wattmeters (including one for three phase), Shallenberger recording ammeter; lightning arresters, Westinghouse, Stanley Wagner and Thomson Houston transformers, and a General Electric 10,000 volt testing transformer, high potential condenser, Wimshurst influence machine, Ruhmkorff coils, Crooke's tubes, fluoroscope wireless telegraph apparatus; Hopkinson permeameter for testing the magnetic qualities of iron, instruments for measuring instantaneous current and voltage in alternating current circuits, according to Duncan, Fessenden contact maker, earth inductor, Ayrton and Perry secohmmeter, fixed and variable standards of inductance, double sets of telegraph and telephone apparatus; Lummer-Brodhum and Bunsen photometers with accessories for arc and incandescent light photometry and Hefner standard amyl-acetate lamp (these however are not as yet set up). Copper voltmeters, balances, thermometers, portable rheostats and numerous minor appliances complete this portion of the equipment. Among arc lights may be mentioned the Manhattan, Upton, Adams-Bagnall, Toerring, Thomson, Saf-

ford and United Electric long burning enclosed arcs, Thomson and other lamps for alternating current, the Ward and Universal (two in series of 110 volt circuits), the Thomson-Houston and Ball for series circuits, and one the gift of Mr. W. A. Turbayne.

### MINERALOGICAL LABORATORY.

This laboratory contains a collection of hand specimens of minerals and rocks for the purpose of training students in handling and becoming familiar with the more common varieties of both ; it is also provided with balances for determining the specific gravity of minerals.

Blowpipe instruction is given here, there being seating room, blow-pipe burners and accommodation for thirty-six students working at once.

### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two Brown coke furnaces for crucibles and muffles, two pulverizers, a muller, and all other necessary appliances for pulverizing and preparing ores for fire assay. The pulp balances for weighing charges and the delicate balances for weighing gold and silver buttons are kept in a room opening off the assay laboratory. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope ; also the necessary appliances for making rock sections by hand. Six petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silver copper plates, and a Frue Vanner. The

concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse-power Edison motor, which is supplied with current from the city circuit. The mill room is also provided with settling tanks for the tailings and concentrates. During last year a pair of Hamilton rolls for dry crushing was added to the mill equipment.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a large brick assay furnace and a reverberatory furnace for roasting sulphide and arsenical ores; leaching vats for treating ores by the cyanide process and a chlorination plant.

This completes the equipment for treating gold ores, and makes it possible to extract the gold from the concentrates saved by the Frue Vanner.

### CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratory will accommodate about 20 students. It is furnished with convenient work tables, and fume cupboards, and supplied with the most recent apparatus for gravimetric, volumetric and gasometric

analysis, both scientific and technical. Besides balances by the best makers, and of the most recent construction, furnaces for fusion, organic analysis, etc., and all the requisites for the assay of ores, furnace and other technical products in the wet way, the apparatus includes an experimental vacuum pan, a filter press, the latest forms of Fischer's, Mahler's, Junker's and Carpenter's apparatus for the determination of the heating power of fuel, facilities for the electrolytic determination of metals, including a Gulcher thermo-electric pile; spectrosopes, polarisopes and microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

During the past year a laboratory for gas analysis and calorimetic work has been fitted up.

### PHYSICAL LABORATORY.

University of Toronto.

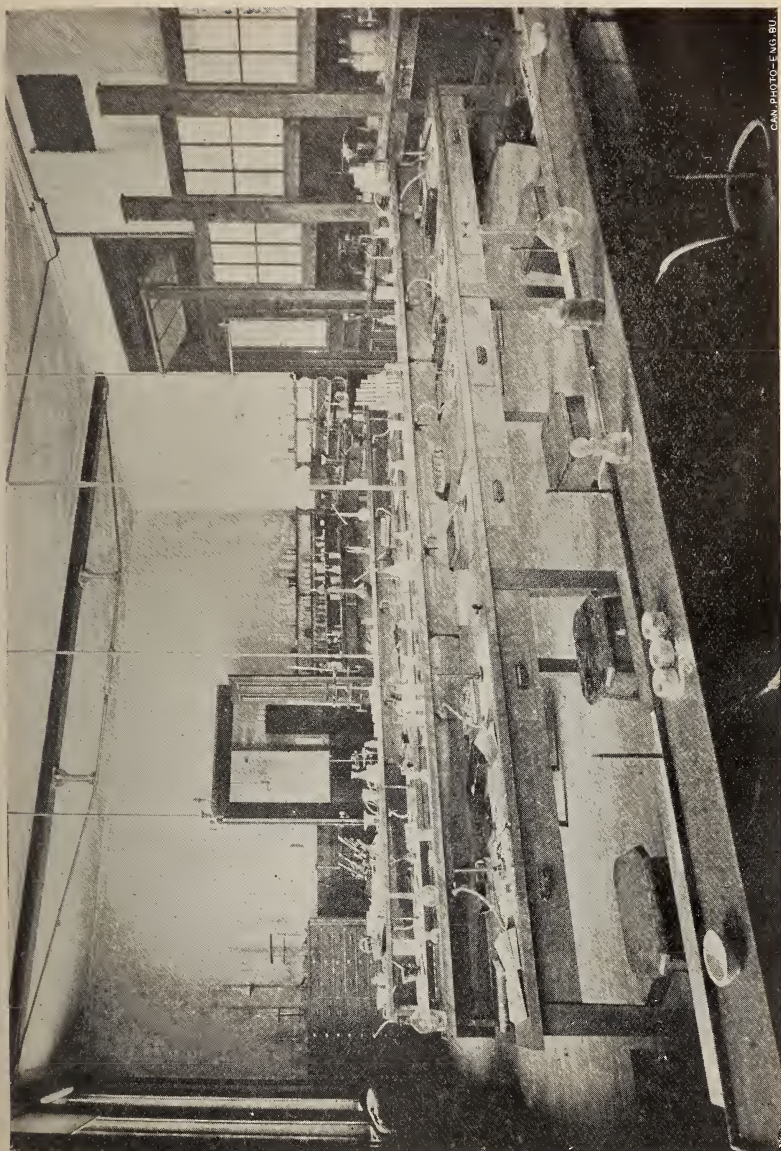
The physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

### MUSEUMS.

The Geological Museum includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for





CAN. PHOTO-ENG. BU.

BLOWPIPE LABORATORY.

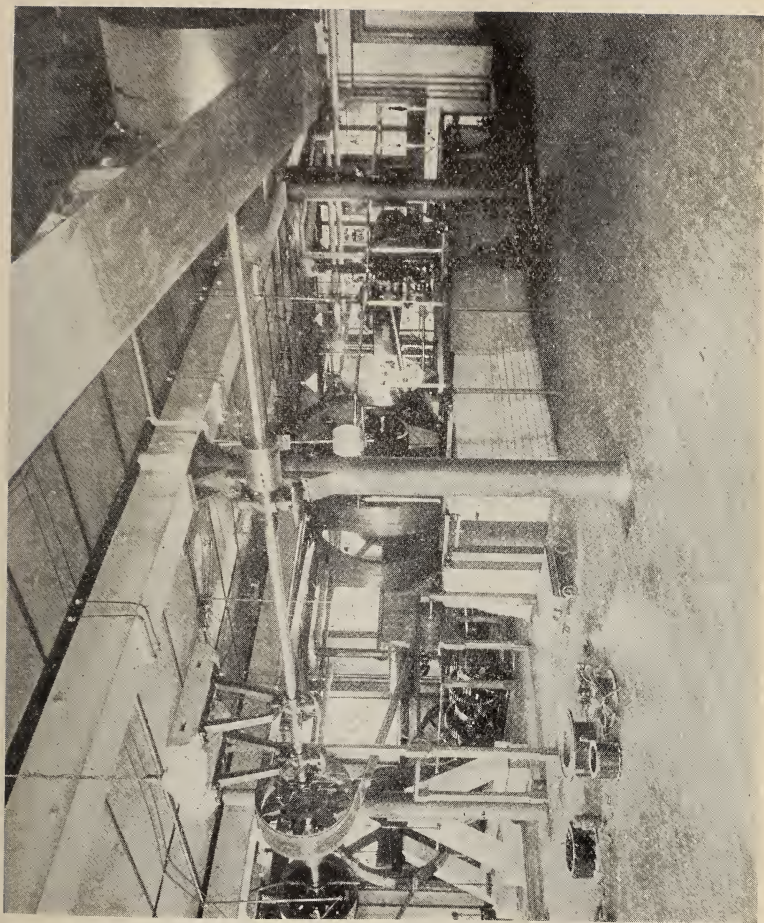




MINERALOGICAL COLLECTION.



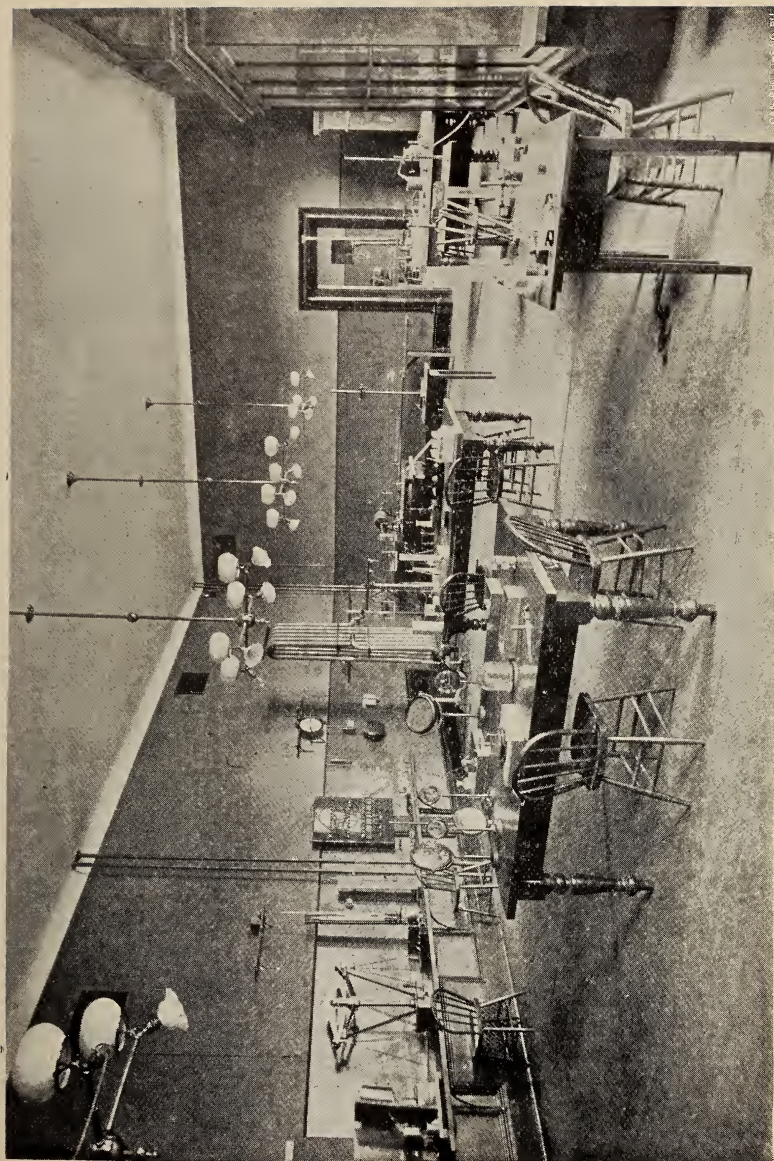




EXPERIMENTAL ENGINE.







ELEMENTARY PHYSICAL LABORATORY (UNIVERSITY OF TORONTO).



comparison and reference in advanced classes ; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the Province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive schistose and sedimentary rocks ; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The paleontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

### LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference in the subjects of study pursued in the school has been formed and is being added to year by year.

## LIST OF DONORS TO THE LIBRARY.

- American Society of Civil Engineers—Proceedings.  
Association of Engineering Societies—Journal.  
Blackwood, A. E.—Stone.  
Bureau of Mines—Report.  
Canadian Mining Institute—Journal.  
Columbia University—Quarterly.  
Department of Mines, Nova Scotia—Report.  
Geological Survey of Canada—Report.  
Gzowski, Estate of the late Sir Casimir—  
    Transactions of American Society of Civil Engineers,  
        1874-1898.  
    Transactions of Canadian Society of Civil Engineers,  
        vol. I., 1887—vol. XII., 1898.  
    Proceedings of The Institution of Civil Engineers,  
        vol. LXIII., 1880—vol. CXXXII., 1898.  
Institution of Engineers and Shipbuilders in Scotland—  
    Transactions.  
Institution of Junior Engineers—Transactions.  
Institution of Mechanical Engineers—Proceedings.  
Royal Institute of British Architects—Journal and Pro-  
    ceedings.  
Society of Chemical Industry—Journal.  
Société des Ingénieurs Civils de France—Mémoires.  
United States Coast and Geodetic Survey—Report.  
United States Government Tests of Metals, etc.—Report.  
University of Toronto—Studies.
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## GYMNASIUM AND ATHLETIC GROUNDS.

*(From the Calendar of the University of Toronto.)*

“The University Gymnasium was completed and equipped in 1893. It is fully provided with the best and most modern appliances for physical culture, and contains a running track, shower baths and swimming bath, besides the necessary dressing-rooms and other conveniences. A competent instructor in Gymnastics is in constant attendance to superintend and direct the exercises of students. In addition to the lawn in front of the main University Building and the campus in the rear, a large plot of ground on Devonshire Place has been prepared and set apart as an Athletic Field. By this addition the facilities for football, cricket, tennis and other out-door athletic sports are doubled, as compared with previous accommodation; and by these grounds, in conjunction with the Gymnasium, ample opportunity is afforded to all students for healthful exercise and physical development. To assist in meeting the expenses of the Gymnasium, a nominal annual fee is imposed on those who avail themselves of its advantages. The supervision of all athletic matters has been intrusted by the Councils to an Athletic Board, consisting of six members appointed from the Faculty and the officers of the Athletic Association. All applications of clubs for the use of grounds must be made annually to this Board. All such applications must be accompanied by a list of officers. In the case of new clubs, the list of officers must be accompanied by particulars as to the organization and objects of the club making application.”

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## ATHLETIC ASSOCIATION.

## DIRECTORATE.

*(From the Calendar of the University of Toronto.)*

Pres. — President Loudon.	Dir.—E. P. Brown.
Dir.—Professor Fletcher.	“ F. H. Wood.
“ Professor C. H. C. Wright.	“ G.M. Bertram.
“ J. A. Jackson, B. A.	“ F. C. Jackson.
Vice-Pres.—G. W. Ross, B. A.	
Sec.-Treas.—V. E. Henderson, B.A.	

The athletic association is now the paramount body in University Athletics, and has entire jurisdiction over the athletic clubs using the University name, and over their finances, members, and policy subject to the University authorities. Henceforth no financial arrangement can be entered into by any such club without the sanction of the Directorate. No expenditure of any kind in connection with any such club can be made without the written order of the Secretary-Treasurer of the Directorate.

## STUDENTS' UNION BUILDING.

*(From the Calendar of the University of Toronto.)*

“ In 1894, additions were made to the front of the building in which the Gymnasium is situated, consisting of a large hall for public meetings, a reading-room and committee rooms. This additional accommodation is available for the work of the various student societies and for academic purposes. Applications for the use of rooms, accompanied by a list of officers and a copy of the constitution of the society making application, must be made, through the President, to the joint committee of the Councils on Gymnasium and Students' Union Building, at the beginning of the session, or from time to time as oc-



casion requires. Arrangements have also been made by which recognized societies may obtain the use of committee-rooms on application to the janitor of the Students Union Building.

### LODGING AND BOARD.

Accommodation is readily obtainable in numerous private boarding-houses within convenient distance of the School, at a cost of from three dollars upwards for comfortable lodging with board; or rooms may be rented at a cost of from one dollar per week upwards, and board obtained separately at moderate rates. A list of accredited boarding-houses is kept by the Secretary of the University College Young Men's Christian Association, and students are recommended to consult him with reference to the selection of suitable accommodation.

### RUGBY FOOTBALL.

The Mulock Cup, which was presented by the Hon. Wm. Mulock, M.A., LL.D., to the University of Toronto Rugby Football Club for inter-college competition, brings out each year a large number of contestants from the University and affiliated colleges.

#### Rugby Football Club of the School of Practical Science.

##### OFFICERS.

Hon. President . . . . .	Principal Galbraith.
President . . . . .	J. T. M. Burnside.
Vice-President . . . . .	W. J. Bowers.
Sec.-Treas. . . . .	A. G. Lang.
Manager of senior team . . . . .	W. Elwell.
Captain of senior team . . . . .	G. A. Hunt.
Manager of junior team . . . . .	F. R. Miller.
Captain of junior team . . . . .	R. A. Bryce.

## LIST OF PLAYERS.

## SENIOR TEAM.

Alison, J. G. R.	Henry, J. S.
Bertram, G. H.	Hunt, G. A. (Capt.)
Brereton, W. P.	Lang, A. G.
Burwash, N. A.	McArthur, R. E.
Campbell, W.	McLennan, A. L.
Campbell, A. R.	Madden, J. F.
Dickson, G. W.	Powers, G. H.
Douglas, W. E., B.A.	Robertson, H. D.
Empey, J. M.	Thorne, S. M.
Foreman, W. E.	Harvey, C.
Gibson, A. E.	

## JUNIOR TEAM.

Belton, C. H.	McKitrick, C. W.
Bonnell, M. B.	Millar, C. J.
Bryce, R. A.	Miller, F. R.
Burnham, F. W.	Mills, J. C.
Coulson, C. L.	Mullins, E. E.
Depew, H. H.	Parsons, W. R. W.
Gzowski, H. N.	Rutherford, T.
Harcourt, F. T., B.A.	Smith, J. H.
McGuire, R. A.	White, H. F.

## ASSOCIATION FOOTBALL.

In order to encourage Association Football on the College Campus, the Faculty of the University of Toronto presented a cup, known as the Faculty Cup, to the Inter-College Association Football Club for annual competition among the University and affiliated colleges.

Association Football Club of the School of Practical Science.

## OFFICERS.

Hon. Pres.....	C. H. C. Wright, B.A. Sc.
President.....	E. Gibson.
Vice-President.....	R. H. Barrett.
Sec.-Treas.....	W. P. Brereton.
Captain.....	F. C. Jackson.
Manager.....	J. T. Broughton.

## COMMITTEE.

IV. Year Representative . . . .	G. Dickson.
III.   "                   "	....W. G. Chace.
II.   "                   "	....J. A. Whelihan.
I.   "                   "	....W. Young.

## LIST OF PLAYERS.

Barrett, R. H.	McKay, J. J.
Brereton, W. P.	Miller, F. R.
Broughton, J. F.	Mills, J. E.
Depew, H. H.	Small, H. S.
Gibson, A.	Whelihan, J. A.
Gordon, E. R.	Williams, C. G.
Jackson, F. C. Capt.	Young, W. H.

## HOCKEY.

The trophy which is competed for annually among the Colleges in Hockey is known as the Jennings Cup, and is the gift of W. T. Jennings, Mem. Inst. C. E., Consulting Engineer.

## Hockey Club of The School of Practical Science.

## OFFICERS.

Hon. President . . . . .	Dr. Ellis.
President . . . . .	E. V. Neelands.
Sec. and Treas . . . . .	J. A. Whelihan.
Manager Senior Team . . . . .	F. C. Jackson.
Captain Senior Team . . . . .	A. G. Lang.
Manager Junior Team . . . . .	F. T. Harcourt, B.A.
Captain Junior Team . . . . .	H. W. Evans.

## LIST OF PLAYERS.

## SENIOR TEAM.

Burwash, N. A.	Lang, A. G.
Campbell, W. A.	Marrs, C. H.
Dixon, H. A.	Morley, R. W.
Elwell, W.	Thorne, S. M.
Jackson, F. C.	

## JUNIOR TEAM.

Challies, J.	Mills, J. E.
Coulson, C. L.	Pace, J. D.
Evans, H. W.	Hardoe, W. S.
Harcourt, F. T., B.A.	Steele, D. L.
Johnston, C. K.	Trees, S. L.
Milden, A. J.	

## FENCING.

For Fencing, a number of Trophies have been presented by the Club, and great interest is taken in the annual competitions for championships.

Senior Champion,	- - J. R. Roaf, S.P.S.
Junior           ,,	- - - F. W. Baldwin, Arts.

The former was presented with a gold medal, the gift of John Falconbridge. The latter with a pair of foils, the gift of the club.

## Fencing Club of the University of Toronto.

## OFFICERS.

Hon. President .....	John Falconbridge.
President .....	G. M. Bertram, S.P.S.
Vice-President .....	J. R. Roaf, S.P.S.
Sec. and Treas .....	W. A. Duff, S.P.S.
Maitre d'Armes ...	Serg Williams.

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# THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

## Officers for 1901-1902.

<i>President</i> .....	R. H. BARRETT.
<i>Vice-President</i> .....	R. W. MORLEY.
<i>Recording Secretary</i> .....	F. N. RUTHERFORD.
<i>Treasurer</i> .....	E. A. JAMES.
<i>Corresponding Secretary</i> .....	T. S. NASH.
<i>Editor</i> .....	To be appointed
<i>Librarian</i> .....	A. A. WANLESS.
<i>Assistant Librarian</i> .....	F. A. GABY.
<i>Graduates' Representative</i> ....	W. A. DUFF.
<i>Fourth Year</i> <i>do.</i> .....	H. P. RUST.
<i>Third Year</i> <i>do.</i> .....	D. SINCLAIR.
<i>Second Year</i> <i>do.</i> .....	M. A. STEWART.
<i>First Year</i> <i>do.</i> .....	To be elected.

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society publishes a pamphlet annually, containing the best papers read at the meetings.

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## SESSION 1900-1901.

## STUDENTS IN ATTENDANCE.

## FIRST YEAR.

## Regular Students.

2. Alexander, J. H. .... Brampton.
3. Angus, H. H. .... London.
3. Beatty, J. A. .... Fergus.
5. Begg, A. W. .... Bullock's Corners.
2. Belton, C. H. .... London.
3. Bonnell, M. B. .... Bobcaygeon.
2. Brown, G. .... Windsor.
2. Bryce, R. .... Toronto.
1. Burgess, E. L. .... Burgessville.
3. Burley, R. J. .... Regina, N. W. T.
3. Burnham, F. W. .... Peterboro.
4. Challies, J. B. .... Winchester.
2. Corbett, J. T. .... Puce.
2. Coulson, C. L. .... Welland.
3. Davison, A. E. .... Prescott.
3. Depew, H. H. .... Hamilton.
3. Eakins, S. W. .... Belleville.
3. Fensom, C. J. .... Toronto.
2. Flick, J. G. .... Ottawa.
2. Fuce, E. O. .... Toronto.
1. Gardner, J. C. .... Niagara Falls.
1. Gillespie, P. .... Cobourg.
2. Gordon, E. R. .... Belleville.
3. Gray, A. .... Port Credit.
1. Gzowski, H. N. .... Toronto.



2. Hamilton, J. F. . . . . Dunedin.
2. Hanes, G. S. . . . . Windsor.
2. Harcourt, F. T. . . . . Toronto.
1. Hayes, L. J. . . . . Toronto.
1. Henderson, F. D. . . . . Crathie.
2. Horton, J. A. . . . . Hurondale.
3. Jackson, J. G. . . . . London.
1. Jackson, J. H., O.L.S. . . . . Windsor.
1. James, E. A. . . . . Thornhill.
3. Johnston, C. K. . . . . Pefferlaw.
1. Johnston, H. . . . . Meaford.
4. Keagey, J. W. . . . . Dundas.
1. Kernahan, M. D. . . . . Toronto.
3. Larkworthy, W. J. . . . . Mitchell.
3. Latornell, A. J. . . . . Meaford.
1. McAuslan, H. J. . . . . Heathcote.
3. McFarlane, J. A. . . . . Donegal.
1. McGuire, R. A. . . . . St. Catharines.
3. McKellar, J. O. . . . . Penetanguishene.
1. McKitrick, C. W. . . . . Petrolea.
1. McNaughton, A. L. . . . . Cornwall.
3. Maher, W. R. . . . . Eganville.
5. Marriott, F. G. . . . . Toronto.
1. Milden, A. J. . . . . Cornwall.
3. Miller, M. L. . . . . Aylmer.
3. Mitchell, P. H. . . . . Waterloo.
2. Montgomery, R. H. . . . . Brantford.
2. Morton, P. E. . . . . Belhaven.
3. Mullins, E. E. . . . . Toronto.
3. Nevitt, T. H. . . . . Toronto.
2. O'Connor, C. H. . . . . Sault Ste. Marie.
3. Pace, J. D. . . . . Orillia.
3. Paris, J. . . . . White Lake.
2. Parsons, W. R. W. . . . . Toronto.
3. Patten, B. B. . . . . St. George.

3. Pinkney, D. H. . . . . Morriston.
2. Plunkett, T. H. . . . . Meaford.
3. Ross, R. B. . . . . Toronto.
3. Rutherford, F. N. . . . . South Monaghan
3. Shipe, H. M. . . . . Toronto.
3. Smith, H. G. . . . . St. Catharines.
1. Smith, J. H. . . . . New Hamburg.
2. Stevens, W. A. . . . . Chatham.
3. Trees, S. L. . . . . Toronto.
2. Umbach, J. E. . . . . Elmira.
1. Waldron, J. . . . . Pine Grove.
3. Wass, S. B. . . . . Granton.
3. White, F. . . . . London.
2. Williams, C. G. . . . . London.
3. Wilson, J. M. . . . . Toronto.
1. Wilson, N. D. . . . . Toronto.
1. Worthington, W. R. . . . . Toronto.
1. Young, C. R. . . . . Picton.
2. Young, W. H. . . . . Clifford.

#### Non-regular Students Taking Full Course.

3. Acres, H. G. . . . . Paris.
3. Algie, J. . . . . Alton.
3. Charlebois, J. P. . . . . Toronto.
2. Elmsley, B. R. . . . . Toronto.
2. Evans, H. W. . . . . Toronto.
3. Fuller, V. M. S. . . . . Toronto.
3. Gaby, F. A. . . . . Toronto.
1. Gordon, J. P. . . . . Toronto.
1. Greene, E. A. . . . . Orillia.
3. Greenwood, W. K. . . . . Toronto.
3. Gurney, E. H. . . . . Toronto.
1. Hendry, M. C. . . . . Toronto.
1. Irving, T. C. . . . . Toronto.
3. Legge, A. H. . . . . Jefferson.

3. McCuaig, O. B. .... Toronto.
2. McKinnon, H. D. .... Finch.
3. Maus, C. A. .... Paris.
3. Meader, J. E. .... Orillia.
2. Millar, C. J. .... Toronto.
1. Miller, F. R. .... Ingersoll.
3. Milne, W. J. .... Brown's Corners.
3. Mills, J. E. .... Guelph.
1. Oliver, E. W. .... Toronto.
3. Oliver, J. P. .... Eberts.
3. Pardoe, W. S. .... Toronto.
2. Philp, D. H. .... Petrolea.
1. Porte, W. B. .... Toronto.
3. Rose, H. G. .... Elora.
3. Small, H. S. .... Toronto.
1. Southworth, H. S. .... Toronto.
1. Steele, D. L. .... Meaford.
1. Stewart, M. A. .... Toronto.
3. Townsend, C. J. .... Toronto.
1. Weddell, R. G. .... Trenton.

## SECOND YEAR.

1. Alison, J. G. R. .... Toronto.
3. Barber, H. G. .... Milton.
3. Batt, T. W. .... Toronto Junction.
3. Beatty, F. R. .... Toronto.
1. Blair, W. J. .... Embro.
3. Breslove, J. .... Toronto.
3. Brown, J. M. .... Fergus.
1. Burwash, N. A. .... Toronto.
2. Campbell, A. R. .... Collingwood.
2. Campbell, W. .... Fullerton.
2. Christie, W. .... Chesley.
3. Clendening, W. G. .... Walkerton.
2. Conlon, F. T. .... Thorold.

3. Connor, H. V.....Sarginson.
3. Corrigan, T. E.....Carlisle.
1. Costin, W. E.....Gobles.
2. Culbert, M. T.....London.
2. Cumming, R.....Scotsburn, N. S.
1. Douglas, W. E., B.A.....Toronto.
3. Dunlop, R. J.....Toronto.
2. Edwards, W. M.....Iroquois.
3. Elwell, W.....Toronto.
2. Empey, J. M.....Thamesford.
3. George, R. E.....Port Elgin.
1. Gibson, A. E.....Ingersoll.
3. Goodwin, A. C.....Grimsby.
1. Gourlay, W. A.....Toronto.
2. Henry, J. S.....Toronto.
3. Henwood, C.....Port Hope.
3. Johnston, D. M.....Toronto.
2. Knight, R. H.....Bruce Mines.
3. Lang, A. G.....Toronto.
5. Langmuir, F. L.....Toronto.
3. Mace, F. G.....Toronto.
3. McBride, A. H.....Toronto.
1. MacKay, J. J., O. L. S.....Woodstock.
3. MacKay, J. T.....Toronto.
1. McLennan, A. L.....Toronto.
3. Madden, J. F.....Toronto.
3. Marrs, C. H.....Beamsville.
3. Mathison, P.....Union.
3. Mennie, R. S.....Toronto.
1. Moore, F. A.....Toronto.
1. Moore, H. H.....Deer Park.
1. Morley, R. W.....Toronto.
1. Nash, T. S.....Morrisburg.
1. Powell, G. G.....Toronto.
1. Ratz, W. F.....Elmira.

1. Robertson, D. F. . . . . Almonte.
3. Robertson, H. D. . . . . Walkerton.
3. Roy, J. E. . . . . Listowel.
1. Sill, A. J. . . . . Jarvis.
3. Sinclair, D. . . . . Cheltenham.
2. Steele, T. J. . . . . Boxall.
3. Sutherland, W. H. . . . . Toronto.
3. Taylor, T. . . . . Cheltenham.
2. Teasdale, C. M. . . . . Concord.
3. Wanless, A. A. . . . . Toronto.
3. Whelihan, J. A. . . . . St. Marys.
3. Zahn, H. J. . . . . Stratford.

## THIRD YEAR.

1. Barrett, R. H. . . . . Amherstburg.
3. Beatty, W. G. . . . . Fergus.
3. Bertram, G. M. . . . . Toronto.
3. Bowers, W. J. . . . . Toronto.
3. Brandon, E. T. . . . . Toronto.
3. Brereton, W. P. . . . . Bethany.
3. Broughton, J. T. . . . . Harriston.
3. Carmichael, C. G. . . . . Markham.
3. Chace, W. G. . . . . St. Catharines.
3. Christie, A. G. . . . . Manchester.
3. Cockburn, J. R. . . . . Toronto.
1. Duff, W. A. . . . . Hamilton.
2. Eason, D. E. . . . . Keene.
1. Gagné, S. . . . . St. Joseph d' Alma. P. Q.
3. Gibson, N. R. . . . . Toronto.
2. Hamer, A. T. . . . . Bradford.
1. Harvey, C. . . . . Indian Head, Assa.
2. Jackson, F. C. . . . . Seaforth.
3. Laidlaw, A. . . . . Durham.
3. Lumbers, W. C. . . . . Toronto.
3. McCollum, G. C. . . . . Welland.
3. Macdougall, A. C. . . . . Toronto.

3. McMaster, A. T. ....Toronto.
1. MacMillan, G. ....South Finch.
3. McVean, H. G. ....Dresden.
2. Matheson, W. C. ....Milton.
3. Middleton, H. T. ....Toronto.
2. Parsons, J. L. R., B.A. ....Toronto.
1. Power, G. H. ....Toronto.
3. Price, H. W. ....Toronto.
1. Rust, H. P. ....Toronto.
3. Sauer, M. V. ....Toronto.
3. Stevenson, W. H. ....Lancaster.
1. Willson, R. D. ....Toronto.

## FOURTH YEAR.

- Ardagh, E. G. R. ....Toronto.
- Barley, J. H. ....Mitchell.
- Craig, J. A. ....Toronto.
- Davison, J. E. ....Toronto.
- Dickson, G. W. ....Toronto.
- Dixon, H. A. ....Eglinton.
- Foreman, W. E. ....Toronto.
- Guy, E. ....Columbus.
- Hemphill, W. ....Toronto.
- Holcroft, H. S. ....Toronto.
- Johnston, J. A. ....Pefferlaw.
- Latham, R. ....Eglinton.
- McMillan, J. G. ....Dutton.
- Neelands, E. V. ....Lindsay.
- Pope, A. S. H. ....Toronto.
- Roaf, J. R. ....Toronto.
- Saunders, H. W. ....Petrolea.
- Tennant, W. C. ....Toronto.
- Thorne, S. M. ....Toronto.
- Thorold, F. W. ....Toronto.
- Weir, H. M. ....Brantford.



## Occasional Students.

DeCew, J. A., Grad. S.P.S. . . . . Fenelon Falls.

Hunt, G. A. . . . . Galetta.

McArthur, R. E., Grad. S.P.S. . . . Toronto.

## PRIZEMEN.

## Engineering.

- 1879.— I. Year . . . . J. McAREE . . . . . 1st prize.  
 1880.— II. Year . . . . J. L. MORRIS . . . . . 1st prize.  
 1881.— I. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
       II. Year . . . . D. JEFFREY . . . . . 1st prize.  
 1882.— I. Year . . . . A. R. RAYMER . . . . . 1st prize.  
       I. Year . . . . E. W. STERN . . . . . 2nd prize.  
       II. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
       III. Year . . . . D. JEFFREY . . . . . 1st prize.  
 1883.— I. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
       I. Year . . . . A. M. BOWAN . . . . . 2nd prize.  
       II. Year . . . . A. R. RAYMER . . . . . 1st prize.  
       II. Year . . . . E. W. STERN . . . . . 2nd prize.  
       III. Year . . . . G. H. DUGGAN . . . . . 1st prize.  
 1884.— II. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
       III. Year . . . . E. W. STERN . . . . . 1st prize.  
       III. Year . . . . A. R. RAYMER . . . . . 2nd prize.  
 1885.— I. Year . . . . A. F. LOTT . . . . . 1st prize.  
       I. Year . . . . J. ROGER . . . . . 2nd prize.  
       II. Year . . . . T. K. THOMSON . . . . . 1st prize.  
       III. Year . . . . B. A. LUDGATE . . . . . 1st prize.  
 1886.— I. Year . . . . C. H. C. WRIGHT . . . . . 1st prize.  
       I. Year . . . . J. E. ROSS . . . . . 2nd prize.  
       II. Year . . . . A. E. LOTT . . . . . 1st prize.  
 1887.— I. Year . . . . H. E. T. HAULTAIN . . . . . 1st prize.  
       II. Year . . . . C. H. C. WRIGHT . . . . . 1st prize.  
       III. Year . . . . A. E. LOTT . . . . . 1st prize.  
       III. Year . . . . J. ROGER . . . . . 2nd prize.

- 1888.— I. Year.....E. B. MERRILL.....1st prize.  
           I. Year.....F. M. BOWMAN.....2nd prize.  
           II. Year.....D. D. JAMES.....1st prize.  
           III. Year .... C. H. C. WRIGHT .....1st prize.
- 1889.— I. Year.....J. K. ROBINSON.....1st prize.  
           I. Year .... G. E. SILVESTER .....2nd prize.  
           II. Year.....E. B. MERRILL.....1st prize.  
           II. Year.....F. M. BOWMAN.....2nd prize.  
           III. Year.....D. D. JAMES.....1st prize.
- 1890.— I. Year.....C. FAIRCHILD .....1st prize.  
           II. Year .... J. K. ROBINSON.....1st prize.  
           III. Year.....F. M. BOWMAN.....1st prize.  
           III. Year.....E. B. MERRILL . . . . .2nd prize.
- 1891.— I. Year .... A. J. MCPHERSON.....1st prize.  
           I. Year.....R. B. WATSON.....2nd prize.  
           II. Year .... J. B. GOODWIN.....1st prize.  
           III. Year .... G. E. SILVESTER.....1st prize.  
           III. Year.....C. W. DILL.....2nd prize.
- 1892.— I. Year.....A. E. BERGEY .....1st prize.  
           I. Year.....R. W. ANGUS.....2nd prize.  
           II. Year.....A. J. MCPHERSON.....1st prize.  
           II. Year.....R. B. WATSON.....2nd prize.  
           III. Year.....E. J. LASCHINGER. ....1st prize.  
           III. Year.....C. FAIRCHILD .....2nd prize.

The grant for prizes was withdrawn at the close of 1892.

#### Architecture.

The prizes in Architecture is the gift of Mr. D. B. Dick, Architect, Toronto.

- 1891.— I. Year.....H. BALLANTYNE.  
 1892.— I. Year.....J. A. EWART.  
 1893.— I. Year.....A. HARKNESS.  
 1894.— I. Year.....E. A. FORWARD.  
 1895.— I. Year.....W. F. SCOTT.  
 1896.— I. Year.....D. MACKINTOSH.  
 1899.— I. Year.....W. F. SHEPHERD.

**Civil Engineering.**

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C. E., New York.

1897.—III. Year . . . . . M. B. WEEKES.

1898.—III. Year . . . . . J. A. STEWART.

1899.—III. Year . . . . . T. SHANKS.

1900.—III. Year . . . . . E. H. PHILLIPS.

**Mechanical and Electrical Engineering.**

Donor, Mr. F. A. Riehle, Philadelphia.

1897.—III. Year . . . . . A. T. GRAY.

1898.—III. Year . . . . . F. C. SMALLPEICE.

**Certificates in Mining and Metallurgy.**

Date of certificate.	Name.	Date of certificate.	Name.
1896.	Johnson, G.	1896.	Tye, A. T.
1898.	McMillan, A. N.	1897.	Webster, E. B.
1900.	Smith, A. H.		

**Certificate in Electricity.**

Date of certificate.	Name.
1896.	Sifton, E. I.

**UNIVERSITY OF TORONTO.****Degree of Bachelor of Applied Science (B.A.Sc.)**

Date of admission.	Name.	Date of admission.	Name.
1893.	Alison, T. H.	1894.*	Goodwin, J. B.
1897.*	Angus, R. W.	1899.	Grant, W. F.
1896.	Armstrong, J.	1898.	Gray, A. T.
1897.*	Bain, J. W.	1897.*	Haight, H. V.
1894.*	Ballantyne, H. F.	1900.	Hare, W. A.
1895.	Beauregard, A. T.	1897.*	Harkness, A. H.
1899.	Boyd, W. H.	1895.	Herald, W. J.
1896.	Brodie, W. M.	1896.	Hull, H. S.

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\* Degree with honors.

1895.. Bucke, W. A.	1894.. James, D. D.
1900.. Burnside, J. T. M.	1893. James, O. S.
1898.. Carpenter, H. S.	1895.*Job, H. E.
1899. Carter, W. E. H.	1895.. Johnson, S. M.
1898. Charlton, H. W.	1896.. Johnson, A. C.
1894.*Chewett, H. J.	1894.*Keele, J.
1900.*Chubbuck, L. B.	1899.. Korman, J. S.
1900.. Coulthard, R. W.	1894.. Laidlaw, J. T.
1896.. Dobie, J. S.	1893.. Laing, A. T.
1897.*Elliott, H. P.	1893.*Laschinger, E. J.
1895.*Ewart, J. A.	1893.*Lawson, W.
1893.. Lea, W. A.	1900.*Revell, G. E.
1894. McAllister, A. L.	1900.. Richards, E.
1895.. McAllister, J. E.	1898.*Robinson, A. H. A.
1893.. McAree, J.	1900.*Shanks T.
1897.. Macallum, A. F.	1895.. Shields, J. D.
1893.. McEntee, B.	1899.. Shipley, A. E.
1896.*McGowan, J.	1894.*Speller, F. N.
1896.*McKinnon, H. L.	1898.. Smiley, R. W.
1894.*McPherson, A. J.	1894.. Squire, R. H.
1895.. McTaggart, A. L.	1898.*Stull, W. W.
1897.. Macbeth, C. W.	1900.*Tennant, D. C.
1897.. Martin, T.	1893.. Thomson, R. W.
1894.*Merrill, E. B.	1896. Tremaine, R. C. C.
1893.. Milne, C. G.	1900.. Wagner, W. E.
1896.. Mines, W. H.	1898.. Weekes, M. B.
1895.*Minty, W.	1899.*Williamson, D. A.
1894.. Mitchell, C. H.	1893.*Wright, C. H. C.
1900.. Monds, W.	

## Degree of Civil Engineer (C.E.)

Date of admission.	Name.	Date of admission.	Name.
1898..	Alison, T. H.	1886..	Kennedy, J. H.
1898..	Ashbridge, W. T.	1895...	McAllister, J. E.

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\* Degree with honors.

1895.. Bowman, A. M.	1898.. Mitchell, C. H.
1893.. Bowman, F. M.	1896 .. Moore J. E. A.
1892.. Chewett, H. J.	1885.. Morris, J. L.
1900.. Connor, A. W.	1892.. Thomson T. K.
1900. Haultain, H. E. T.	1894.. Tyrrell, H. G.
1893. Innes, W. L.	1889.. Tyrrell, J. W.

## Degree of Mining Engineer (M.E.)

Date of admission.	Name.
1897.....	Bucke, M. A.
1900.....	Laidlaw, J. T.

## Degree of Mechanical Engineer (M.E.)

Date of admission.	Name.
1900.....	White, A. V.

## Degree of Electrical Engineer (E.E.)

Date of admission.	Name.
1896.....	Ross, R. A.

## GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

### 1881.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	J. L. Morris, C.E., O.L.S..... Pembroke, Ont.	Engineer and Surveyor.

### 1882.

1. D. Jeffrey ..... Contractor.  
Delmar, Iowa.
1. J. H. Kennedy, C.E., O.L.S.... Chief Engineer Vancouver, Victoria  
Vancouver, B.C. & Eastern Ry.
1. J. McAree, B.A.Sc., D.T.S.... Chief Engineer Pritchard Harbour  
Rat Portage, Ont. Copper Mining & Development  
Co.

### 1883.

1. D. Burns, O.L.S..... With the Keystone Bridge Co.  
A. M. Can. Soc. C.E.,  
Pittsburg, Pa.
1. G. H. Duggan, M. Can. Soc. C.E.. Chief Engineer Dominion Bridge  
Montreal, Que. Co.
1. J. W. Tyrrell, C.E., D.L.S.... Surveying Staff Dept. of Interior.  
Ottawa, Ont.

### 1884.

1. W. C. Kirkland ..... Asst. Engineer, Drainage Commis-  
New Orleans, La. sion of New Orleans.
1. J. McDougall, B.A..... York County Engineer.  
A. M. Inst. C.E.,  
Court House, Toronto, Ont.
1. A. R. Raymer ..... Chief Engineer Penn. & L. E. Ry.  
Pittsburg, Pa.
1. James Robertson, O.L.S..... Engineer and Surveyor.  
Glencoe, Ont.
1. E. W. Stern..... Chief Engineer Jackson Architecte-  
315 E. 28th St., New York. tural Iron Works.

### 1885.

1. F. W. Bleakley ..... Civil Engineer.  
Sullivan Block, Seattle, W.T.



GRADUATES.—*Continued.*

## 1885.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	H. J. Bowman, D. & O.L.S. ....	Consulting Engineer. M. Can. Soc. C.E. Berlin, Ont.
1.	E. E. Henderson, O.L.S. ....	Civil Engineer. Henderson P.O., Piscataquis, Me.
1.	B. A. Ludgate, O.L.S. ....	Engineering staff Union Pacific R'y Omaha, Neb. Co.
1.	O. McKay, O.L.S. ...	Chief Engineer, Lake Erie and De- Walkerville, Ont. troit River R'y.

## 1886.

1.	A. M. Bowman, D.L.S. ....	Asst. Engineer Ohio River Im- Bellevue, Pa provement.
1.	E. B. Hermon, D. & O. L. S. ....	Gordon, Hermon & Burwell, Vancouver, B.C. Engineers and Surveyors.
1.	Robert Laird, O.L.S. ....	Consulting and Mining Engineer. Rat Portage, Ont.
1.	T. Kennard Thomson, C.E. ....	Consulting Engineer. M. Am. Soc. C.E., 13-21 Park Row, New York.
1.	H. G. Tyrrell, C.E. ....	Asst. Engineer Boston Bridge Wks. A. M. Can. Soc. C.E., 70 Kilby st., Boston, Mass.

## 1887.

1.	J. C. Burns, (deceased).	
1.	A. E. Lott. ....	Consulting Railway Engineer. Mexico, Mexico.
1.	A. L. McCulloch, O.L.S. ....	City Engineer. A. M. Can. Soc. C.E., Nelson, B.C.
1.	F. Martin, M.B., O.L.S. ....	Physician.
1.	C. H. Pinhey, D. & O.L.S. ....	Engineer for contractor Soulanges Coteau Landing. Canal.
1.	J. Rogers, O.L.S. ....	Town Engineer. Mitchell, Ont.

## 1888.

1.	J. F. Apsey, O.L.S. ....	With James River Construction Co. 115 East Franklin st., Richmond, Va.
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GRADUATES.—*Continued.*

1888,

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	W. T. Ashbridge.....	Town Engineer, Lindsay, Ont Temple Bldg., Toronto, Ont.
1.	Edward F. Ball .....	Civil Engineer. A. M. Can. Soc. C.E., Room 400, Grand Central Station, New York, N.Y.
1.	D. B. Brown, O.L.S. ....	Civil Engineer. Cuidad de Guatemala, Guatemala.
1.	C. M. Canniff .....	Chief Engineer Luxfer Prism Co. Toronto, Ont.
1.	H. J. Chewett, C.E., B.A.Sc...	Mining Engineer. A. M. Can. Soc. C.E., 83½ York St., Toronto, Ont.
1.	J. Gibbons, D. & O.L.S.....	Surveying Staff Dept. of Interior. Ottawa, Ont.
1.	R. McDowall, O.L.S. ....	Town Engineer. A. M. Can. Soc. C.E., Owen Sound, Ont.
1.	G. W. McFarlen, O.L.S.....	City Engineer's Staff. Toronto, Ont.
1.	C. J. Marani.....	Manager Canada Permanent and P.O. Box 245, Western Canada Mortgage Cor- Vancouver, B.C. poration.
1.	G. R. Mickle, B.A .....	Lecturer in Mining Engineering, Toronto, Ont. School of Practical Science.
1.	J. H. Moore, O.L.S .....	Town Engineer. Smith's Falls, Ont.
1.	G. H. Richardson .....	Divisional Engineer C.P.R. Cranbrook, B.C.
1.	K. Rose .....	Civil and Mining Engineer. 62 William St., New York.
1.	J. E. Ross, D. & O.L.S.....	Surveying Staff Dept. of Interior. Kamloops, B.C.
1.	C. H. C. Wright, B.A.Sc.....	Professor of Architecture, School Toronto, Ont. of Practical Science.

1889.

1. B. Carey.  
Toronto, Ont.

GRADUATES.—*Continued.*

1889.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	W. J. Chalmers . . . . . Vanport, Pa.	Asst. Engineer Ohio River Improve- ment.
1.	W. A. Clement . . . . . A.M. Can. Soc. C.E., City Engineer's Office, Toronto, Ont.	Roadways Engineer.
1.	G. F. Hanning . . . . . Port Arthur, Ont.	Engineer's Staff Ont. & Rainy River Ry.
1.	H. E. T. Haultain, C.E. . . . . Nelson, B.C.	Mining Engineer.
1.	J. Irvine . . . . . Harriston, Ont.	Civil Engineer.
1.	D. D. James, B.A . . . . . B. A. Sc., O.L.S., Michipicoten Harbor, Ont.	Engineer's Staff Algoma Central R'y.
1.	F. X. Mill (deceased).	
1.	H. K. Moberly . . . . . Innisfail, Alberta.	With Quebec Fire Assurance Co.
1.	T. R. Rosebrugh, M.A . . . . . Toronto, Ont.	Professor in Electrical Engineering School of Practical Science.
1.	T. Wickett, M.D. . . . . Watford, Ont.	Physician.

1890.

5. W. E. Boustead (deceased).
1. F. M. Bowman, C.L.S., C.E. . . . Chief Engineer, Riter & Conley.  
Alleghany, Pa.
1. M. A. Bucke, M.E. (deceased).
1. G. D. Corrigan (deceased).
1. J. A. Duff, B.A. . . . . Lecturer in Applied Mechanics,  
A.M. Can. Soc. C.E., School of Practical Science.  
Toronto, Ont.
1. A. B. English,  
Toronto, Ont.
1. N. L. Garland . . . . . Garland Manufacturing Co.  
76 Bay St., Toronto, Ont.
1. S. Hutcheon, O.L.S. . . . . City Engineer.  
Guelph, Ont.
1. W. L. Innes, O.L.S., C.E. . . . Manager Simcoe Canning Co.  
Simcoe, Ont.

GRADUATES.—*Continued.*

## 1890.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	E. B. Merrill, B.A., B.A.Sc. . . . . Toronto, Ont.	Post Graduate course University of Toronto.
1.	J. R. Pedder (deceased).	
3.	R. A. Ross, E.E . . . . . 17 St. John St., Montreal, P.Q.	Consulting, Electrical and Mechanical Engineer.
1.	T. H. Wiggins, O.L.S. . . . . Finch, Ont.	Drainage Engineer.
1.	W. J. Withrow . . . . . Toronto, Ont.	With Luxfer Prism Co.

## 1891.

1.	H. J. Beatty, O.L.S. . . . . Eganville, Ont.	Surveyor.
1.	T. R. Deacon, O.L.S. . . . . Rat Portage, Ont.	Managing Director Mikado Gold Mining Co.
1.	C. W. Dill. . . . . Bracebridge, Ont.	Contracting Engineer.
5.	O. S. James, B.A.Sc. . . . . Toronto, Ont.	Analytical Chemist and Assayer, 17 Richmond St., East.
1.	A. Lane . . . . . Barstow, Texas.	Civil Engineer.
1.	J. E. McAllister, B.A.Sc. . . . . Hamilton, Ont.	With Hamilton Bridge Works.
3.	E. B. Merrill, B.A., B.A.Sc. . . . . Toronto, Ont.	Post Graduate course University of Toronto.
1.	J. E. A. Moore, C.E. . . . . Cleveland, O.	Erecting Engineer, Willman Seaver Co.
1.	W. Newman, O.L.S. . . . . A.M. Can. Soc. C.E., Windsor, Ont.	City Engineer.
1.	J. K. Robinson (deceased).	
1.	W. B. Russel . . . . . Pembroke, Ont.	Russel, Poulin & Co., Contractors.
1.	G. E. Silvester, O.L.S. . . . . Sudbury, Ont.	DeMorest & Silvester, Civil and Mining Engineers.
1.	H. D. Symmes. . . . . Niagara Falls, Ont.	Manager, Sturgeon Lake Mining Co.

## 1892.

1.	J. R. Allan, O.L.S. . . . . Renfrew, Ont.	Surveyor and Engineer.
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## \* GRADUATES.—Continued.

1892.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	T. H. Alison, B.A.Sc., C.E . . . .	Chief Engineer, Augustes, Smith & 39-41 Cortland St., New York. Co.
1.	A. G. Anderson . . . . .	With Niagara Falls Power Co. Niagara Falls, N.Y.
1.	C. Fairchild, D. & O.L.S. . . . .	Surveying Staff Dept. of Interior. Ottawa, Ont.
1.	J. B. Goodwin, B.A.Sc . . . . .	Asst. Engineer Niagara Falls Power Niagara, Falls, N.Y. Co.
4.	C. E. Langley . . . . .	Langley & Langley, Architects. Can. Life Bldg., Toronto, Ont.
1.	A. T. Laing, B.A.Sc. . . . .	Demonstrator in Surveying, Toronto, Ont. School of Practical Science.
1.	E. J. Laschinger, B.A.Sc. . . . .	Asst. Engineer General Water System Consolidated Gold Fields of Johannesburg, Transvaal, S.A. South Africa.
5.	W. Lawson, B.A.Sc . . . . .	Chief Chemist Alameda Sugar Co. Alvarado, Cal.
3.	W. A. Lea, B.A.Sc. . . . .	Mechanical Engineer Mexico St. Mexico, Mexico. Ry.
1.	B. McEntee, B.A.Sc., . . . . .	28 Queen St. E., Toronto, Ont.
3.	C. G. Milne, B.A.Sc. . . . .	Chief Draftsman Hamilton Bridge Hamilton, Ont. Works.
1.	Charles H. Mitchell, B.A.Sc. . . . .	Hydraulic Engineer. C.E., A. M. Can. Soc. C.E., Niagara Falls, Ont.
1.	N. L. Playfair . . . . .	Superintendent Playfair Lumber Midland, Ont. Co.
1.	J. M. Prentice (deceased). . . . .	
1.	J. A. Ross. . . . .	Chief Draftsman L. S. & M. S. Ry. Cleveland, O.
1.	Albert N. Smith . . . . .	With Keystone Bridge Co. Pittsburg, Pa.
1.	R. W. Thomson, B.A.Sc. . . . .	Consulting Mining Engineer. Johannesburg, Transvaal, S.A.
3.	A. V. White, M.E . . . . .	Managing Director the Spoke and 24-30 Great Eastern St., Specialty Mfg. Co. London, E. C.

1893.

1. A. G. Ardagh. . . . . Staff of Division Engineers, C.P.R. Toronto, Ont.

GRADUATES.—*Continued.*

1893.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
4.	*H. F. Ballantyne, B.A.Sc . . . . .	Ballantyne & Evans, Engineers and 20 Nassau St., New York. Architects.
1.	G. L. Brown, O.L.S. . . . .	County Engineer, Dundas, Stormont Morrisburg, Ont. and Glengarry.
1.	*L. C. Charlesworth . . . . .	Government Agent of Mining Lands. Rat Portage, Ont.
1.	T. H. Dunn . . . . .	Civil Engineer. Fresno, Cal.
1.	J. M. R. Fairburn, O.L.S. . . . .	Assistant Engineer, Trent Valley Beaverton, Ont. Canal.
4.	*W. Fingland . . . . .	Architect. 39 Caryl Ave, Yonkers, N. Y.
1.	C. Forester, Toronto, Ont.	
1.	*W. J. Francis . . . . .	Division Engineer Trent Canal. A.M. Can. Soc. C.E., Peterboro, Ont.
3.	*A. R. Goldie . . . . .	Manager Goldie & McCulloch Engine Galt, Ont. Works.
3.	S. C. Hanly . . . . .	Mechanical Engineer. Midland, Ont.
4.	*J. Keele, B.A.Sc . . . . .	Geological Survey. Ottawa, Ont.
1.	J. T. Laidlaw, B.A.Sc., M.E . . . . .	Consulting Mining Engineer. Fort Steele, B.C.
3.	F. L. Lash . . . . .	Electrical Engineer. Batavia, Java.
1.	A. L. McAllister, B.A.Sc . . . . .	With New Jersey Steel and Iron Trenton, N.J. Co.
1.	T. J. McFarlen . . . . .	Chief Chemist Nova Scotia Steel Ferrona, N.S. Co.
1.	*A. J. McPherson, B.A.Sc . . . . .	Town Engineer. D.L.S., Brockville, Ont.
1.	A. F. Macallum, B.A.Sc. . . . .	Engineer for Hamilton, Grimsby 367 Wellesley St., and Beamsville Ry. Toronto, Ont.
1.	W. T. Main . . . . .	Civil Engineer. Brampton Ont.

\*Diploma with honors.



GRADUATES.—*Continued.*

1893.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	V. G. Marani .....	Assistant Engineer Cleveland Gas, Cleveland, Ohio. Light and Coke Co.
1.	W. Mines, B.A.Sc .....	With Brown Hoisting Company. Cleveland, Ohio.
3.	*J. M. Robertson .....	Engineer Chambly Electric Works. Chambly, P.Q.
1.	R. Russel .....	Contractors' Engineer Inverness & Port Hood, N.S. Richmond Ry.
1.	*F. N. Speller, B.A.Sc .....	Mining Engineer, in charge Ontario Bureau of Mines, Mining Exhibit, Pan-American Toronto, Ont. Exposition, Buffalo, N.Y.
1.	R. H. Squire, B.A.Sc., O.L.S ..	Engineer and Surveyor. Brant Chambers, Brantford, Ont.
1.	W. V. Taylor .....	Engineers Staff C.P.R. Winnipeg, Man.
1.	*R. B. Watson ....	Mining Engineer. Dawson, Yukon Ter.

1894.

3.	*R. W. Angus, B.A.Sc .....	Lecturer in Mechanical Engineering, Toronto, Ont. School of Practical Science.
1.	H. F. Barker .....	With Office Specialty Mfg. Co. Toronto.
1.	A. T. Beauragard, B.A.Sc .....	With United Gas Improvement Co. Philadelphia, Pa.
1.	A. E. Bergey .....	With Riter & Cauley. Alleghany, Pa.
3.	D. G. Boyd .....	Inspector of Mines. Michipicoten, Ont.
3.	W. A. Bucke ....	With Canadian General Electric Co. Toronto, Ont.
1.	J. Chalmers .....	Asst. Engineer Ont. & Rainy River Port Arthur. Ry.
4.	*J. A. Ewart, B.A.Sc .....	Arnoldi & Ewart, Architects. Ottawa, Ont.
3.	W. J. Herald, B.A.Sc .....	With Cambria Steel Works. Johnstown, Pa.
3.	H. E. Job, B.A.Sc .....	Manager Toronto & Hamilton Hamilton, Ont. Electric Co.

\* Diploma with honors.

GRADUATES.—*Continued.*

1894.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	A. C. Johnston, B.A.Sc . . . . . Lorain, O.	Mechanical Engineer, Lorain Steel Co.
1.	S. M. Johnston, B.A.Sc., P.L.S. . . . . Greenwood, B.C.	Engineer and Surveyor.
1.	J. E. Jones. . . . .	With Carnegie Steel Co. Pittsburg, Pa.
3.	N. M. Lash . . . . .	Asst. Electrical Engineer Bell Tele- phone Co. Montreal, P.Q.
1.	*A. L. McTaggart, B.A.Sc . . . . .	With the Lackawanna Iron and Steel Co. Scranton, Pa.
3.	*W. Minty, B.A.Sc . . . . .	Asst. Engineer Hick, Hargreaves & Co., Ltd. Bolton, Lancashire, England.
3.	C. J. Nicholson, Preston, Ont.	
1.	H. Rolph . . . . .	Mining Engineer. Dawson City, Yukon Ter.
1.	J. D. Shields, B.A.Sc . . . . .	Mining Engineer. Rat Portage, Ont.
3.	A. K. Spotton. . . . .	Chief Engineer, John Inglis & Sons. Toronto, Ont.
1.	Angus Smith, O.L.S. . . . .	City Engineer. Stratford, Ont.
3.	R. T. Wright. . . . .	With Goldie & McCulloch Co. Galt, Ont.

1895.

1.	J. Armstrong, B.A.Sc . . . . .	Engineers Staff Can. Northern Ry. Swan River, Man. Co.
3.	A. E. Blackwood. . . . .	Manager New York Office Sullivan 71 Broadway, New York. Machinery Co.
1.	E. J. Boswell, O. L. S. . . . .	Asst. Engineer Crows' Nest Pass Lethbridge, B.C. Ry.
3.	G. Brebner . . . . .	With General Electric Co. Schenectady, N.Y.
3.	W. M. Brodie, B.A.Sc . . . . .	Manager Pendrith & Co. Toronto, Ont.

\* Diploma with honors.

GRADUATES.—*Continued.*

1895.

COURSE.	NAME AND ADDRESS.	OCCUPATION,
3.	L. L. Brown .....	With Engineering Contract Co., 71 3 Plaza St., Brooklyn, N. Y.      Broadway, New York.
4.	R. J. Campbell .....	Artist, Chicago Tribune. Chicago, Ill.
3.	A. W. Connor, B.A., C.E. ....	With Hamilton Bridge Works. Hamilton, Ont.
1.	J. S. Dobie, B.A.Sc .....	Mining Engineer. Port Arthur, Ont.
1.	F. W. Gurnsey .....	Engineer Neepawa Gold Mining Co. Wabigoon, Ont.
4.	*A. H. Harkness, B.A.Sc .....	Fellow in Applied Mechanics, Toronto, Ont.      School of Practical Science.
3.	H. S. Hull, B.A.Sc .....	With Frick Co. Ice and Refriger- Waynesboro, Pa.      ating Machinery.
3.	*J. McGowan, B.A., B.A.Sc ..	Lecturer Toronto Technical School. Toronto, Ont.
3.	W. N. McKay .....	With the Snider Hughes Co. Cleveland, O.
3.	H. L. McKinnon, B.A.Sc .....	With the Snider Hughes Co. Cleveland, O.
1.	W. W. Meadows, O.L.S .....	Engineer and Surveyor. Rat Portage, Ont.
1.	F. J. Robinson, D. & O.L.S....	Assistant Engineer Trent Valley Kirkfield, Ont.      Canal.
3.	F. T. Stocking .....	With Pike's Peak Power Co. Victor, Col.
3.	R. C. C. Tremaine, B. A.Sc ..	Manager Exeter Electric Light and Exeter, Ont.      Power Co.

1896.

2.	*J. W. Bain, B.A.Sc .....	Demonstrator in Analytical Chem- Toronto, Ont.      istry, School of Practical Science.
2.	L. T. Burwash .....	Mining Recorder, Timber and Stewart River P.O., Yukon.      Crown Lands Agent.
3.	*G. M. Campbell .....	With Westinghouse Electric and Pittsburg, Pa.      Mfg. Co.

\*Diploma with honors.

GRADUATES,—*Continued.*

1896.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
2.	J. A. DeCew..... Fenelon Falls, Ont.	With T. H. DeCew & Sons, Stave Manufacturers.
3.	*H. P. Elliott, B.A.Sc ..... Pittsburg, Pa.	With Westinghouse Electric and Mfg. Co.
3.	W. C. Gurney..... Toronto, Ont.	Chief Engineer Steam and Hot Water Heating Department Gurney Foundry Co.
3.	*H. V. Haight, B.A.Sc ..... Sherbrooke, P. Q.	Engineer Canadian Rand Drill Co.
1.	W. F. Laing..... Sault Ste. Marie, Ont	With Engineer's Staff Algoma Cen- tral Ry.
3.	R. R. Lawrie (deceased).	
3.	C. MacBeth, B.A.Sc ..... Detroit, Mich.	With Engineer's Staff Michigan Central Railroad.
3.	J. A. McMurchy..... Pittsburg, Pa.	With Westinghouse Machine Co.
1.	T. Martin, B.A.Sc ..... Port Arthur, Ont.	Engineer's Staff Ont. Rainy River Ry.
3.	R. R. Shipe..... Toronto, Ont.	With Toronto Engraving Co.

1897.

2.	E. Andrewes, B.Sc..... Montreal, P. Q.	Demonstrator, McGill University.
2.	*J. A. Bow..... Sault Ste. Marie, Ont.	Explorer, Lake Superior Power Co.
1.	H. S. Carpenter..... B.A. Sc., O.L.S., Collingwood, Ont.	Town Engineer.
5.	H. W. Charlton, B.A.Sc ..... Ottawa, Ont.	Assistant Analyst at Experimental Farm.
4.	*E. A. Forward..... A. M. Can. Soc. C.E., Dickinson's Landing, Ont.	Asst. Engineer Cornwall Canal.
3.	*A. T. Gray, B.A.Sc ..... Schenectady, N. Y.	With General Electric Co.

\*Diploma with honors.

GRADUATES.—*Continued.*

1897.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	W. A. B. Hicks .....	With Northey Mfg. Co. Toronto, Ont.
4.	C. F. King .....	Toronto, Ont.
1.	H. W. Proudfoot.....	With Jack Lake Mining Co. Matawin, Ont.
2.	*A. H. A. Robinson, B.A.Sc ..	Fellow in Chemistry, Toronto, Ont. School of Practical Science.
4.	W. F. Scott.....	Architect. McKinnon Bldg., Toronto, Ont.
3.	*R. W. Smiley, B.A.Sc. ....	With Shelby Steele Tube Co. Cleveland, O.
2.	*W. W. Stull, B.A.Sc., O.L.S..	With DeMorest & Silvester, Engin- Sudbury, Ont. eers and surveyors.
1.	*M. B. Weekes, B.A.Sc .....	Fellow in Mining Engineering, Toronto, Ont. School of Practical Science.
1.	E. A. Weldon ....	Engineering Staff Ont. and Rainy Port Arthur, Ont. River Ry.

1898.

2.	W. H. Boyd, B.A.Sc .....	Geological Survey. Ottawa, Ont..
2.	W. E. H. Carter, B.A.Sc .....	Secretary Bureau of Mines. Toronto, Ont.
3.	E. H. Darling. ....	With Canadian Bridge Co. Walkerville, Ont.
1.	W. F. Grant, B.A.Sc .....	With Willis Chipman, Civil Engi- Toronto, Ont. neer.
1.	T. S. Kormann, B.A.Sc .....	Asst. Resident Engineer G.T. Ry. Toronto, Ont.
3.	J. E. Lavrock .....	With Niagara Falls Power Co. Niagara Falls, N.Y.
4.	D. Mackintosh.....	With Green & Wicks, Architects. Buffalo, N.Y.

\*Diploma with honors.

GRADUATES.—*Continued.*

## 1898.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	F. W. McNaughton, O. L. S. . . . .	Town Engineer. Cornwall, Ont.
1.	J. H. Shaw, O. L. S. . . . .	Surveyor. Pembroke, Ont.
3.	A. E. Shipley, B. A. Sc. . . . .	With United Coke & Gas Co. 277 Broadway, New York, N. Y.
3.	*F. C. Smallpeice . . . . .	Fellow in Electrical Engineering, Toronto, Ont.                      School of Practical Science
1.	R. W. Smith, P. L. S. . . . .	Surveyor. Rossland, B. C.
1.	*J. A. Stewart, M. A. . . . .	With McClintick-Marshall Con- struction Co. Pittsburg, Pa.
1.	*H. L. Vercoe . . . . .	Engineering Staff Manitoba and Swan River, Man.                      Northern Ry.
3.	T. A. Wilkinson . . . . .	With Niagara Falls Power Co. Niagara Falls, N. Y.
3.	D. A. Williamson, B. A. Sc. . . . .	With McClintock-Marshall Con- struction Co. Pittsburg, Pa.

## 1899.

3.	T. Barber . . . . .	With Georgian Foundry. Meaford, Ont.
2.	J. T. M. Burnside, B. A. Sc. . . . .	Fellow in Civil Engineering Toronto, Ont.                      School of Practical Science.
3.	L. B. Chubbuck, B. A. Sc. . . . .	With Westinghouse Electric Co. Pittsburg, Pa.
2.	G. A. Clothier . . . . .	With St. Eugene Construction and Moyie, B. C.                      Milling Co. Ltd.
1.	C. Cooper, Carlyle, Assa.	
2.	R. W. Coulthard, B. A. Sc., 133 Bedford Road, Toronto.	
3.	J. A. Craig . . . . .	Post Graduate Course Toronto, Ont.                      School of Practical Science.
2.	J. C. Elliott . . . . .	With Mother Lode Mine. Bella Bella, B. C.

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\*Diploma with honours.



GRADUATES.—*Continued.*

1899.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	W. E. Foreman . . . . .	Post Graduate Course Toronto, Ont. . . . . School of Practical Science.
3.	E. Guy . . . . .	Post Graduate Course Toronto, Ont. . . . . School of Practical Science.
3.	*W. A. Hare, B.A.Sc. . . . .	Mechanical Draftsman Scranton, Pa. . . . . Lackawanna Iron and Steel Co.
1.	R. Latham . . . . .	Post Graduate Course Toronto, Ont. . . . . School of Practical Science.
3.	W. Monds, B. A.Sc. . . . .	Fellow in Mechanical Engineering Toronto, Ont. . . . . School of Practical Science.
1.	J. Patterson, B. A. . . . .	1851 Exhibition Science Scholar Cambridge, Eng. . . . . University of Cambridge
3.	A. S. H. Pope . . . . .	Post Graduate Course Toronto, Ont. . . . . School of Practical Science.
2.	*G. E. Revell, B.A.Sc. . . . .	Trent Valley Canal Co. Peterboro, Ont.
3.	*E. Richards, B. A.Sc. . . . .	With Toronto Electric Light Co. Toronto, Ont.
3.	G. A. Saunders. . . . .	With General Electric Co. Schenectady, N. Y.
1.	*T. Shanks, B. A.Sc. . . . .	With Dominion Lands Surveys, Calgary, N. W. T. . . . . Dept. of the Interior.
1.	*D. C. Tennant, B.A.Sc. . . . .	With Dominion Bridge Co. Montreal, P. Q.
3.	W. W. VanEvery . . . . .	With Wm. Hamilton Mfg. Co. Peterboro, Ont.
2.	G. H. Watt . . . . .	Geographical Survey. Ottawa, Ont.
3.	W. E. Wagner, B. A.Sc. . . . .	In charge of Construction Electric Severn Bridge, Ont. . . . . Light Plant for Orillia.
3.	E. Yeates. . . . .	With Westinghouse Electric & Pittsburg, Pa. . . . . Mfg. Co.

1900.

1. J. L. Allan. . . . . City Engineer's Staff.  
Sydney, N.S.

\*Diploma with honors.

GRADUATES.—*Continued.*

1900

COURSE.	NAME AND ADDRESS.	OCCUPATION.
2.	E. G. R. Ardagh..... Toronto, Ont.	Post Graduate Course School of Practical Science.
3.	J. A. Bain..... Pittsburg, Pa.	Structural Dept. S. V. Huber & Co., Consulting Engineers.
3.	J. H. Barley..... Toronto, Ont.	Post Graduate Course, School of Practical Science.
2.	*M. C. Boswell..... Montreal, P.Q.	With Dominion Bridge Co.
1.	L. T. Bray ..... Berlin, Ont.	With H. J. Bowman, Engineer and Surveyor.
3.	J. Clark..... Toronto, Ont.	With Turnbull Elevator Works, 126 John street.
2.	J. E. Davison ..... Toronto, Ont.	Post Graduate Course School of Practical Science.
3.	E. D. Dickinson..... Schenectady, N.Y.	With General Electric Co.
3.	G. W. Dickson..... Toronto, Ont.	Post Graduate Course School of Practical Science.
2.	*H. A. Dixon ..... Toronto, Ont.	Post Graduate Course School of Practical Science.
2.	C. H. Fullerton ..... Morrisburg, Ont.	With G. L. Brown, Engineer and Surveyor.
3.	W. S. Guest..... 18 Czar street, Toronto.	Draftsman.
3.	W. Hemphill ..... Toronto, Ont.	Post Graduate Course School of Practical Science.
3.	S. E. M. Hendersou ..... Schenectady, N.Y.	With General Electric Co.
3.	J. A. Henry..... Schenectady, N.Y.	With General Electric Co.
2.	H. S. Holcroft ..... Toronto, Ont.	Post Graduate Course School of Practical Science.
3.	H. A. Johnston... Toronto, Ont.	With Polson Iron Works.

\*Diploma with honors.

GRADUATES.—*Concluded.*

1900

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	J. C. Johnston.....	City Engineer's Staff. Toronto, Ont.
2.	*J. A. Johnston .....	Post Graduate Course Toronto, Ont.                      School of Practical Science.
2.	R. E. McArthur .....	Special Course in Chemistry Toronto, Ont.                      School of Practical Science.
2.	J. G. McMillan.....	Post Graduate course Toronto, Ont.                      School of Practical Science.
3.	L. Haun Miller.....	Draftsman, The Brown Hoist Co. Cleveland, O.
2.	E. V. Neelands . . . . .	Post Graduate course Toronto, Ont.                      School of Practical Science.
1.	*E. H. Phillips.....	With Dominion Lands Surveys Calgary, N.W.T.                      Dept. of the Interior.
2.	J. R. Roaf .....	Post Graduate course Toronto, Ont.                      School of Practical Science.
3.	*C. H. E. Rounthwaite.....	With the Canadian Electro-Chemi- Sault Ste. Marie, Ont.                      cal Co., Limited.
2.	H. W. Saunders .....	Post Graduate course Toronto, Ont.                      School of Practical Science.
1.	A. Taylor .....	With C.P.R. Land Department. Winnipeg, Man.
1.	W. C. Tennant .....	Post Graduate course Toronto, Ont.                      School of Practical Science.
2.	S. M. Thorne .....	Post Graduate course Toronto, Ont.                      School of Practical Science.
1.	F. W. Thorold.....	Post Graduate course Toronto, Ont.                      School of Practical Science.
1.	H. M. Weir.....	Post Graduate course Toronto, Ont.                      School of Practical Science.
3.	F. D. Withrow.....	Draftsman, John Inglis & Sons. Toronto, Ont.

\*Diploma with honors.

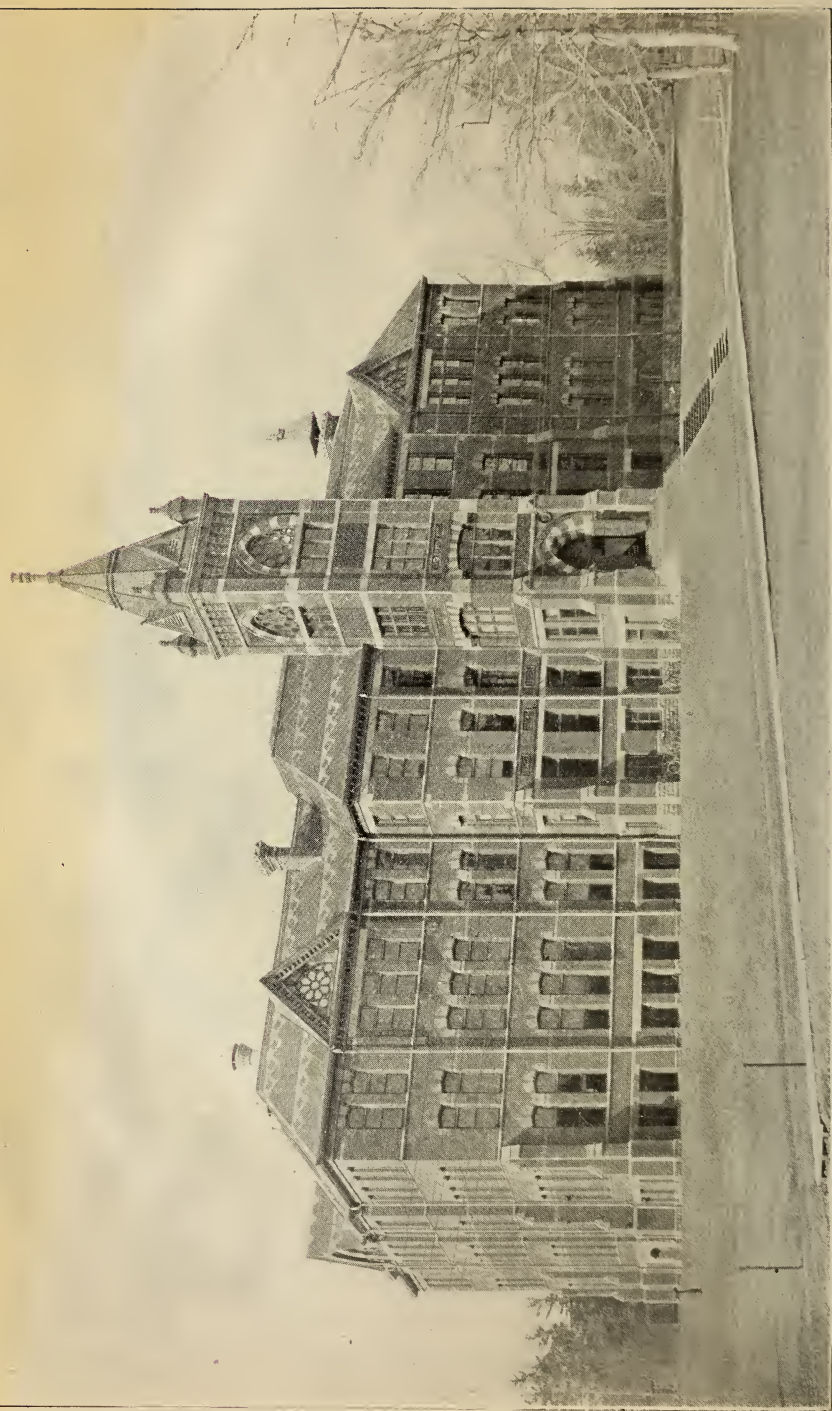












CALENDAR

OF THE

Ontario

School of Practical Science.

(Affiliated to the University of Toronto.)

Faculty of Applied Science and Engineering  
of the  
University of Toronto.



Twenty-Fifth Session, 1902-1903,  
TORONTO.

WARWICK BROS  
& RUTTER &



TORONTO

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# 1902.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
..	..	..	..	..	..	..

25. Meeting of Council.

29. Entrance Examinations begin.

29. Supplemental " "

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

1. **FIRST TERM** begins.

1. Vacation work to be handed in.

10. Meeting of Council.

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

14. Meeting of Council.

9. King's Birthday.

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

12. Meeting of Council.

19. **FIRST TERM** ends.

# 1903.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

5. **SECOND TERM** begins.

9. Meeting of Council.

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
..	..	..	..	..	..	..

13. Meeting of Council.

25. Ash Wednesday Building closed.

# 1903.

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

13. Meeting of Council.  
27. Annual Meeting of the Engineering Society.

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..

10. Good Friday. Building closed.  
11. Lectures and Practical work close.  
13. Meeting of Council.  
17. **Annual Examinations** begin  
22. Thesis for B.A. Sc. to be handed in.  
22. B.A. Sc. Examinations begin.

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

1. **SECOND TERM** ends.  
7. Meeting of Council.

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
..	..	..	..	..	..	..

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

## TIME TABLE—FIRST YEAR.

SESSION 1902-1903.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
8-10	*Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y,	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11	*Electricity and Magn'm, 3, 5 (a) Drawing, 1, 2, 4 do 3, 5 (b)	Drawing, *Heat, (c) *Electricity and Magn'm, 3, 5 (a) Electricity, 3, 5 (b) Drawing, 1, 2, 4		Drawing, *Heat, (c)	*Elect'y & Magn'm, 3, 5 (a) Electricity, 3, 5 (b) History of Arch'te, 4 Drawing, 1, 2	10-11
11-12	Drawing, 1, 2, 3, 4 Chemical Lab'y	Chemistry.	Chemistry.	Chemistry.	Pen and Ink, 4 Drawing, 1, 2, 3, 5	11-12
12-1	Statics, 1, 2, 3, 4 do 5 (a) Chemical Lab'y, 5 (b)	Dynamics.	Descriptive Geometry.	Surveying, 1, 2, 3, 4 Drawing, 5	Statics, do 1, 2, 3, 4 5 (a)	12-1

# TIME-TABLE.

9

2-3	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b) do 1, 2, 4 (b)	2-3
3-4	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b) do 1, 2, 4 (b)	3-4
4-5	Chemical Lab'y, 2, 5 (b) Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3, 4 do 1 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 3, 4 (b)	Chem'l Lab'y, 5 do 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b) do 1, 2, 4 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. (c) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drawing during the hours allotted to Physics.

... Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drawing during the remainder of the Session.

## TIME TABLE—SECOND YEAR.

SESSION 1902-1903.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Rigid Dynamics, 1, 2, 3 History of Arch's, 4	Surveying (Lect.) 1, 2, 4 Electricity, 3	*Calculus, 1, 2, 3, 4	*Astronomy, 1 Lithology, 2 (a) Electricity, 3 Drawing, 4, 2 (b)	*Calculus, 1, 2, 3, 4	9-10
10-11	*Optics, Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	*Hydrostatics, Metallurgy; (b) (a)	Descriptive Geom'y, 1, 2, 3, 4	*Hydrostatics, Metallurgy, (b) (a)	*Optics, Spherical Trig'y, 1, 2, 3 (a) Drawing, 4 (a)	10-11
11-12	*Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y, 3	*Inorganic Chem'y, 5 Pen and Ink, 4 Drawing, 1, 2, 3	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Str.ngth of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1



# TIME-TABLE.

11

2-3	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	Applied Chemistry.	*Physical Lab'y, 3, 5 (a) Orders of Arch'e, 4 Drawing, 1, 2 do 3 (b)	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 3, 4 (b)	3, 5 (a) 2-3 2 (b) 1, 2, 4 (a) 1, 3, 4 (b)
3-4	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing, 1, 2, 4 (b) 5 1, 2, 4 (a) 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 2, 4 (b) 1, 2, 4 (a) 1, 3, 4 (b)	3-4 3, 5 (a) 2 (b) 1, 2, 4 (a) 1, 3, 4 (b)
4-5	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing, 1, 2, 4 (b) 5 1, 2, 4 (a) 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, History of Ornament, 4	4-5 3, 5 (a) 2 (b) 1, 2, 4 (a) 1, 3 (b) 4

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drawing during the remainder of the Session.

## TIME TABLE—THIRD YEAR.

SESSION 1902-1903.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10 *Biology, Thermodyna- mics, Drawing, 5 1, 2, 3, 4	Hydraulics, 1, 2, 3, 4	Thermodyna- mics, History of Arch'te, 4 1, 2, 3	Hydraulics, 1, 2, 3, 4	*Biology, Compound Stress, 1, 3, 4 5	9-10
10-11 Drawing, 1, 2, 3, 4	Astronomy and Geodesy, 1 Electricity, 3 Drawing, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 1, 3, 4	Astronomy, 1 Electricity, 3 Principles of Dec'n, 4 Ore Deposits, 2 (a) Chemical Lab'y, 2 (b)	Drawing, Mechanics of Machinery, 3 1, 2, 4	10-11
11-12 Drawing, 1, 2, 3 History of Archi- tecture, 4	Constructive Design, 1, 4 do, 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Mineralogical Lab'y, 2, 5 (a) Assaying, 2 (b) Drawing, 1, 3, 4	Constructive Design, 1, 4 do, 2, 3 (a) Drawing, 3 (b) Chemical Lab'y, 2 (b)	Drawing, Mining and Ore Dressing, 2 1, 3, 4	11-12
12-1 Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Machine Design, 3	Constructive Design, 1, 2, 3, 4 (a) Assaying, 2 (b) Drawing, 1, 4 (b)	Mineralogy and Geology, 1, 2, 4, 5 Machine Design, 3	Applied Chemistry	12-1

3-3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2 do Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Metallurgy, 2, 5 (b) Drawing, 1, 4 (b)	Descriptive Geometry, 1, 2, 3, 4 (a) Theory of Least Squares, 1, 2, 3 (b) Drawing, 1, 2, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Metallurgy, 2, 5 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Field Work, 1, 2, 4 (b) Chemical Lab'y, 2, 5 (b) Drawing, 3 (b)	2-5
3-4	*Physical Lab'y, 3 (a) *Organic Chemistry, 5 Drawing, 1, 2, 3 (b) do	*Organic Chemistry, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3 do Chem. Lab'y, 2 Pen and Ink, 4 (b)	*Practical Biology, 5 Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Chemical Lab'y, 1, 2 (b) Organic Chemistry, 5 Field Work, 1, 2, 4 (b) Drawing, 3 (b)	3-4
4-5	*Physical Lab'y, 3, 5 (a) Surveying (Lect.), 1, 2, 4 (a) Drawing, 1, 2, 3, 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 Chem. Lab'y, 2	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, 3, 5 (a) do Chemical Lab'y, 1, 2 (b) Field Work, 1, 2, 4 (a) Drawing, 3 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry ; \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are in common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drawing during the remainder of the Session.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such hours as suit the laboratory work.

## FACULTY OF THE SCHOOL.

---

<i>Principal</i> . . . . .	J. GALBRAITH, M.A., M. Can. Soc. C. E.
<i>Bursar</i> . . . . .	L. B. STEWART, O.L.S., D.T.S.
<i>Secretary and Librarian</i> . . . . .	A. T. LAING, B.A.Sc.

## MEMBERS OF THE COUNCIL :

J. GALBRAITH, M.A., M. Can. Soc. C. E.	<i>Prof. of Engineering (Chairman).</i> 62 St. Mary St.
W. HODGSON ELLIS, M.A., M.B.	<i>Prof. of Applied Chemistry.</i> 74 St. Alban's St.
A. P. COLEMAN, M.A., Ph. D.	<i>Prof. of Geology.</i> 476 Huron St.
L. B. STEWART, O.L.S., D.T.S.	<i>Prof. of Surveying and Geodesy</i> 71 Prince Arthur Ave. ( <i>Bursar</i> ).
C.H.C. WRIGHT, B.A.Sc., Mem. O.A.A.	<i>Prof. of Architecture.</i> 524 Bathurst St.
T. R. ROSEBRUGH, M.A.	<i>Prof. of Electrical Engineering.</i> 666 Spadina Ave.
J. A. DUFF, B.A., A.M. Can. Soc. C.E.	<i>Lecturer in Applied Mechanics.</i>
G. R. MICKLE, B.A.	<i>Lecturer in Mining.</i> 10 Queen's Park.
R. W. ANGUS, B.A.Sc.	<i>Lecturer in Mechanical Engineering.</i> 38 Gloucester St.
A. T. LAING, B.A.Sc.	<i>Demonstrator in Surveying (Secretary and Librarian).</i> 270 Wellesley St.
J. W. BAIN, B.A.Sc.	<i>Demonstrator in Analytical Chemistry.</i> 90 Charles St.
W. MONDS, B.A.Sc.	<i>Demonstrator in Mechanical Engineering.</i> 354 Euclid Ave.
.....	<i>Demonstrator in Electrical Engineering.</i>

## ASSISTANT INSTRUCTORS :

A. H. HARKNESS, B.A.Sc.	<i>Fellow in Civil Engineering.</i> 32 Czar St.
-------------------------	--

ASSISTANT INSTRUCTORS.—*Continued.*

- A. H. A. ROBINSON, B.A.Sc. .... *Fellow in Mining Engineering.*  
32 D'Arcy St.
- J. A. CRAIG, B.A.Sc. .... *Fellow in Mechanical Engineering.*  
533 Sherbourne St.
- W. G. CHACE, Grad. S.P.S. .... *Fellow in Electrical Engineering.*  
15 Surrey Place.
- E. G. R. ARDAGH, B.A.Sc. .... *Fellow in Chemistry.*  
28 Leopold St.
- J. T. M. BURNSIDE, B.A.Sc. .... *Fellow in Drawing.*  
163 College St.
- J. A. DECEW, Grad. S. P. S. .... *Lecture Assistant in Chemistry.*  
25 Caer Howell St.

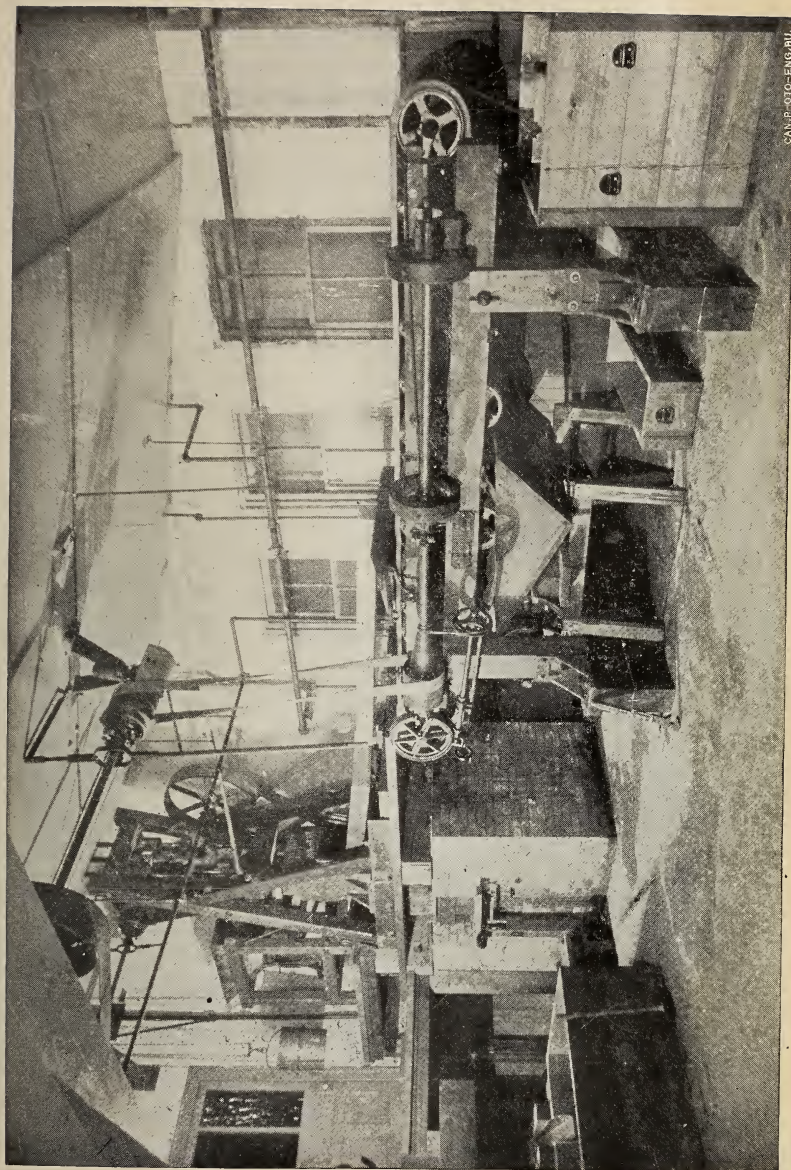
## MEMBERS OF THE FACULTY OF ARTS :

whose classes are attended by the Regular Students of the School:

- JAMES LOUDON, M.A., L.L.D. .... *President and Prof. of Physics.*  
83 St. George St.
- R. RAMSAY WRIGHT, M.A., B.Sc. .... *Prof. of Biology.*  
32 Willecock St.
- ALFRED BAKER, M.A. .... *Prof. of Mathematics.*  
81 Madison Ave.
- W. R. LANG, D.Sc. .... *Prof. of Chemistry.*  
8 University Cresc.
- A. B. MCCALLUM, B.A., M.B., Ph.D. .... *Associate Prof. of Physiology.*  
59 St. George St.
- W. L. MILLER, B.A., Ph.D. .... *Associate Prof. of Physical Chemistry.*  
50 St. Alban's St.
- W. J. LOUDON, B.A. .... *Demonstrator in Physics.*  
103 Walmer Rd.
- C. A. CHANT, M.A. .... *Lecturer in Physics.*  
651 Church St.
- J. C. MCLENNAN, B.A., Ph.D. .... *Demonstrator in Physics.*  
The Dean's House, University College.
- ALFRED T. DELURY, B.A. .... *Lecturer in Mathematics.*  
110 Bedford Rd.
- E. F. BURTON, B.A. .... *Fellow in Mathematics.*  
347 Clinton St.
- G. R. ANDERSON, M.A. .... *Assistant in Physics.*  
652 Spadina Ave.
- J. S. PLASKETT, B.A. .... *Assistant in Physics.*  
36 Bowell Ave.



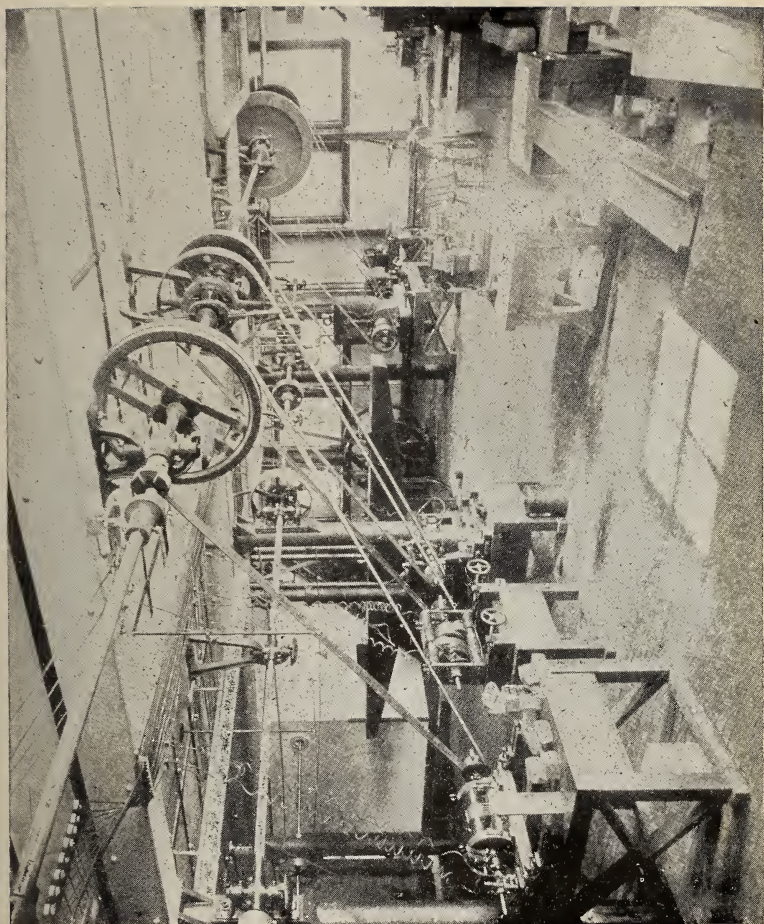




CAN. PHOTO-ENG. BU.

STAMP MILL.





DYNAMO ROOM.





# SCHOOL OF PRACTICAL SCIENCE.

PROVINCE OF ONTARIO.

---

CALENDAR FOR THE SESSION 1902-1903.

---



THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments of science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was

entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz. :—

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

#### DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize

#### THE DEGREE OF B. A. Sc.

After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this



list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.).

#### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.) or Electrical Engineer (E. E.), as the case may be, subject to the rules and regulations established by the University.

#### FACULTY OF APPLIED SCIENCE AND ENGINEERING.

By a statute of the Senate of the University of Toronto, passed on December 14th, 1900, the teaching staff and examiners of the School of Practical Science, together with the examiners for the degree of B. A. Sc. and professional degrees in Engineering, were constituted *ex officio* the Faculty of Applied Science and Engineering of the University of Toronto.

The statute is as follows :—

By the Senate of the University of Toronto,

*Be it enacted :*

1. That the Faculty of Applied Science and Engineering be hereby established.
2. That the courses and examinations of the School of Practical Science leading to the diploma of the school and

to the special certificates of the school, together with the courses and examinations leading to the degrees of Bachelor of Applied Science (B. A. Sc.), Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), and Electrical Engineer (E. E.), be the curriculum and examinations of the University in the said faculty.

3. That the members of the teaching staff of the School of Practical Science be the members of the teaching staff of the University in the said faculty.

4. That the examiners for the School of Practical Science, whether members of the teaching staff of the said school or otherwise, together with the examiners for the degrees named in clause 2, be the examiners of the University in the said faculty.

5. That the regular students of the School of Practical Science in the first, second, third and fourth years respectively be the undergraduates of the University in the corresponding years in the said faculty.

6. That the non-regular, occasional and special students of the School of Practical Science be the non-regular, occasional and special students of the University in the said faculty.

7. That the provisions of this statute apply, as far as may be, to all graduates of the School of Practical Science and to all graduates of the University in Applied Science and Engineering.

8. That no liability shall be incurred by the University of Toronto for the support or maintenance of the faculty hereby established.

# REGULATIONS

## RESPECTING THE

### School of Practical Science,

Approved by Colonel Sir Casimir Stanislaus Gzowski, K. C. M. G.,  
Administrator of the Government of the Province of Ontario, the  
30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.
2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this Vacation shall be determined annually by the Council.
3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :
  - (1) Civil Engineering.
  - (2) Mining Engineering.
  - (3) Mechanical and Electrical Engineering.
  - (4) Architecture.
  - (5) Analytical and Applied Chemistry.
4. The Regular Course for the Diploma of the School in each Department shall be three years.

5. Students may enter the Regular Course in any of the above Departments, either (a) by presenting certificates of having passed the Matriculation Examination in any University in His Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (b) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects:

*Arithmetic.*—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

*Algebra.*—Elementary rules, easy factoring, highest common measure, lowest common multiple, square root, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

*Euclid.*—Books I., II., and III. ; deductions.

*English.*—Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.
7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.
8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.

9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.
10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.

### ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, p. 24.

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (*b*) order in Council, p. 24.

This examination will begin at 9 a.m., Monday, September 29th, 1902.

Candidates are requested to give the Secretary at least two weeks' notice in writing of their intention to take this examination.

## REGULAR COURSES FOR THE DIPLOMA.

See regulations pp. 29 and 30.

The following are the Departments in which the Diploma is granted :—

- (1) Civil Engineering.
- (2) Mining Engineering.
- (3) Mechanical and Electrical Engineering.
- (4) Architecture.
- (5) Analytical and Applied Chemistry.

### SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

YEAR	DESCRIPTION OF PAYMENT	1.	2.	3.	4.	5.
		Civil Engineering.	Mining Engineering.	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
I.	Payable in First Term—					
	Sessional Fees.....	34 00	34 00	35 00	34 00	35 00
	Dues—					
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory .....					
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees .....	35 00	35 00	35 00	35 00	35 00
	Total .....	75 00	75 00	76 00	75 00	76 00



YEAR	DESCRIPTION OF PAYMENT	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
II.	Payable in First Term—					
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00
	Dues—					
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 00	49 00	46 00	46 00	49 00
	Payable in Second Term—					
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00
	Total .....	89 00	89 00	86 00	86 00	89 00
III.	Payable in First Term—					
	Sessional Fees.....	45 00	44 00	45 00	45 00	45 00
	Dues—					
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General.....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory....	.....	3 00	.....	.....	3 00
	Mineralogical Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	48 00	48 00	54 00
	Payable in Second Term—					
	Sessional Fees. ....	45 00	45 00	45 00	45 00	45 00
	Total .....	93 00	98 00	93 00	93 00	99 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows :

Payable in First Term—	
Sessional Fees.....	\$35 00
Dues, Library.....	1 00
Deposits, General.....	2 00
Payable in Second Term—	
Sessional Fees.....	34 00
University Fees.....	20 00
Total.....	<hr/> \$92 00

Fourth year students must also pay the deposits of the laboratories in which they work.

OCCASIONAL STUDENTS.—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library due, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

CERTIFICATES.—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Analytical and Applied Chemistry, Drawing, Lecture Assistant in Chemistry.

Each fellowship is of the value of \$500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September.

#### REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in September, notice in writing of their intention to take such examinations.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in drawing the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper  $15 \times 22$  inches, unless otherwise prescribed.

The Council reserves the right of disposing of the drawings as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

#### Vacation Work.

Vacation work must be handed in on or before October 1st, 1902.

Vacation notes must be on construction only, and contain not less than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not less than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

#### **Supplemental Examinations, Etc.**

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the 29th of September, 1902. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or thesis indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time-table.

#### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, except under such circumstances as may be deemed sufficient by the Council. Application for exemption must be made in writing and the particulars of the case fully stated.

#### PRIZE.

The following prize has been established :

Civil Engineering, 3rd Year, \$10 in books. Donor—Mr. T. Kennard Thomson, C.E., New York.

#### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.



## REGULAR EXAMINATIONS.

(APPROXIMATE LIST.)

## I Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Statics.
Euclid.	Dynamics.
Plane Trigonometry.	Descriptive Geometry.
Analytical Geometry 1,2,3,4.	Surveying . . . . . 1,2,3,4.
History of Architecture . . . 4.	Chemistry, Elementary.
Magnetism and Electric- ity . . . . . 3,5.	Electricity . . . . . 3,5.
	Heat.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes . . . . . 1,2,4.
Architectural Sketches . . . . 4.
Experimental Physics. . . . 3,5.
Practical Electricity . . . . 3,5.
Practical Chemistry.
Practical Mineralogy. . . . 1,2,5.
French and German. . . . . 5.

## II Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus . . . . . 1,2,3,4.	Strength of Materials. 1,2,3,4.
Astronomy . . . . . 1.	Rigid Dynamics . . . . 1,2,3.
Optics.	Theory of Mechanism. . . . 3.
Hydrostatics.	Descriptive Geometry. . . . .
History of Architecture. . . 4.	. . . . . 1,2,3,4.
Orders of Architecture. . . 4.	Surveying. . . . . 1,2,4.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |





*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

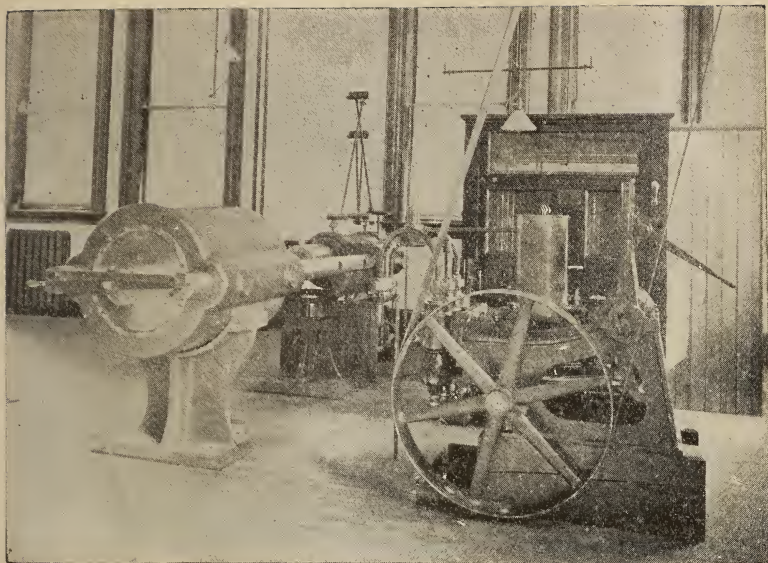
*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School, all the requirements  
thereunto relating:*

*In witness whereof we have signed this Diploma, at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred, and \_\_\_\_\_  
and have caused the Seal of this School to be hereunto affixed*

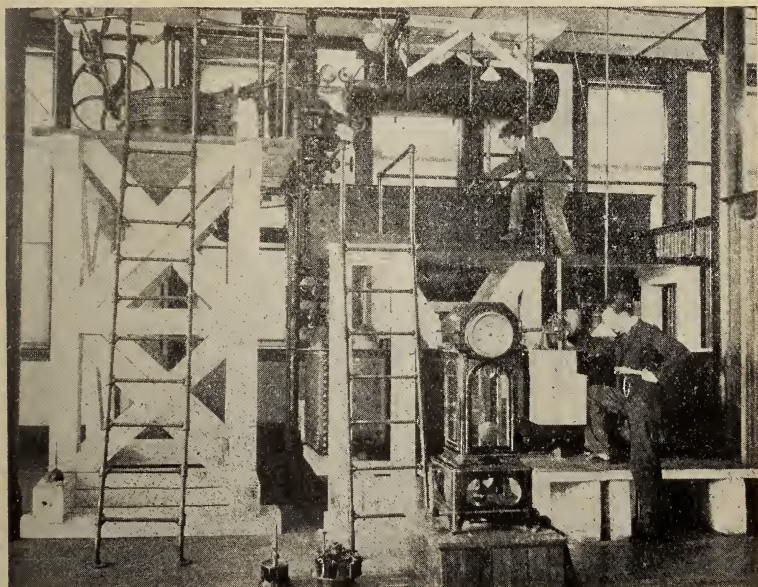
*Chairman.*

*Secretary*





EMERY TESTING MACHINE.



HYDRAULIC PLANT.





Sanitary Plumbing, Heating and Ventilation	4.	Metallurgy	.....2, 5.
Theory of Compound Stress	.....1, 3, 4.	Mining and Ore Dressing	2.
		Ore Deposits	.....2.
		Assaying	.....2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing	.....1, 2, 3, 4.
Field Notes	.....1, 2.
Construction Notes	.....1, 2, 3, 4.
Architectural Sketches	.....4.
Experimental Physics	.....1, 3, 4, 5.
Practical Electricity	.....3.
Thesis at beginning of session.	
Practical Chemistry	.....2, 5.
Determinative Mineralogy	.....2, 5.
Assaying	.....2, 5.

## DEPARTMENT OF CIVIL ENGINEERING.

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers.

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original Surveys.

CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

MINERALOGY.

Introductory course.

PHYSICS.

Heat.

MECHANICS.

Statics and dynamics (with special reference to structures and machines .

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes).

CHEMISTRY.

Advanced chemistry.  
Thermo-chemistry.  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)  
Strength and elasticity of materials.  
Experimental work in engineering laboratory.  
Transit-theodolite surveying.  
Levelling.  
Railway location curves, etc.  
Hydrographic surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.  
Blowpipe practice.  
Determination of minerals.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages 30 and 55.

III Year.

DRAWING.

Subjects of previous years continued.  
Descriptive geometry — shades and shadows,  
stone cutting, perspective projection.  
Original designs — bridges, roofs, floors, arches,  
etc.

## CHEMISTRY (Applied).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).  
Strength and elasticity of materials.  
Theory of construction.  
Practical designs—bridges, roofs, floors, arches,  
retaining walls, foundations, etc.  
Thermodynamics and theory of the steam engine.  
Hydraulics, sewerage, water supply.  
Experimental work in engineering laboratory.  
Levelling.  
Profiles, cross sections, field work and plotting.  
Computation of quantities.  
Mathematical theory of surveying instruments.  
Trigonometrical and barometrical levelling.  
Geodesy (considering the earth a sphere).  
Practical astronomy (treated in the manner  
required for the O.L.S. and D.L.S. examina-  
tions.)  
Least squares.

## MINEROLOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages 30 and 55.

## DEPARTMENT OF MINING ENGINEERING.

This department is designed to afford the necessary preliminary training to students intending to become mining engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographics (including isometric) and oblique projection.

Original surveys.

## CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

## MINERALOGY.

Introductory course.

## PHYSICS.

Heat.

## MECHANICS.

Statics and dynamics, (with special reference to structures and machines.)

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

## DRAWING.

Subjects of the first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures from both copies and original notes.

#### CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

#### ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied .

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location, curves, etc.

Mining surveying.

#### MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

Lithology.

#### METALLURGY.

Iron and steel.

#### PHYSICS.

Hydrostatics.

Optics.

#### EXPERIMENTAL PHYSICS.

Introductory course.

#### VACATION WORK.

See pages 30 and 55.



## III. Year.

## Drawing.

Subject of previous years continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

Laboratory practice.

Wet assays.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Thermodynamics and theory of steam engine.

Hydraulics.

Experimental work in engineering laboratory.

Levelling.

Profiles, cross-sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.

Least squares.

## MINERALOGY AND GEOLOGY.

Economic geology.

Palæontology.

Ore deposits.

Blowpipe analysis and determinative mineralogy,

Metallurgy of gold, silver, nickel, copper, etc.

Mining and ore dressing.

Assaying.

## VACATION WORK.

See pages 30 and 55.

DEPARTMENT OF MECHANICAL AND ELECTRICAL  
ENGINEERING.

This department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, graphics,  
Descriptive geometry in its application to plane  
sided solids, orthographic (including isometric), and oblique projection.

## CHEMISTRY.

General principles of chemistry.  
Elementary Chemistry.  
Laboratory practice.

## MECHANICS.

Statics and dynamics (with special reference to  
structures and machines.)

## SURVEYING.

Application of trigonometry and principles of measurement. (Lectures only.)

## PHYSICS.

Heat.  
Magnetism and electricity (introductory course).  
Electricity (applications of the laws of Ohm,  
Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course.

EXPERIMENTAL PHYSICS.

Introductory course.

II. Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces.

Machines and structures. (drawings made from both copies and original notes.)

CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

Strength and elasticity of materials.

Materials and construction.

Methods and processes.

Experimental work in engineering laboratory.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

Electrical measurements.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 30 and 55.

### III. Year.

DRAWING.

Subjects of previous year continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

ENGINEERING.

Subjects of previous year continued.

Applied mechanics ;

Mechanics of machinery, machine design,  
thermodynamics and theory of the  
steam engine, hydraulics.

Electricity.

Dynamos and motors.

Application of principles to practical problems  
connected with the design, construction and  
testing of various prime movers and machines.

Experimental work in engineering laboratory.

Least squares.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

## ELECTRICAL LABORATORY.

## ORIGINAL DESIGNS.

Engine and machine design.

## VACATION WORK.

See pages 30 and 55.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

## DEPARTMENT OF ARCHITECTURE.

This department is designed to afford the necessary preliminary training to students intending to become Architects.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography, graphics.  
Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.  
Rendering in pencil and pen and ink.

## CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

## PHYSICS.

Heat.

## MECHANICS.

Statics (with reference to structures).

Dynamics (preliminary to the study of hydraulics).

## SURVEYING.

Principles, chain surveying, mensuration.

## HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.

## DRAWING.

Instrumental drawing, drawing from the cast  
sketching and water color, pen and ink.

Descriptive geometry (curved surfaces).

## CHEMISTRY.

Advanced chemistry,

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## MECHANICS.

Statics (pure and applied).

Strength and elasticity of materials.

Materials of construction.

Experimental work in engineering laboratory.



SURVEYING.

Use of transit and level.

Mensuration.

MINERALOGY AND GEOLOGY.

Elements.

METALURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

HISTORY OF ARCHITECTURE.

Greek and Roman.

Romanesque and Byzantine.

ORDERS AND ELEMENTS OF ARCHITECTURE.

HISTORY OF ORNAMENT.

Ancient.

Classic—Greek, Roman.

VACATION WORK.

See pages 30 and 55.

III. Year.

DRAWING.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Water color sketching.

Original designs—floors, trusses, arches, etc.

CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial Chemistry.

Sanitary chemistry.

## THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

## HYDRAULICS.

## SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

## SURVEYING.

Levelling, setting out excavation, mensuration.

## MINERALOGY AND GEOLOGY.

Economic Geology.

## EXPERIMENTAL PHYSICS.

Heat, acoustics.

## HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

## ELEMENTS OF DESIGN.

Principles of planning with special reference to residences.

Relation between plan and elevations.

## HISTORY OF ORNAMENT.

Early Christian ; Gothic and Renaissance.

## PRINCIPLES OF DECORATION.

## VACATION WORK.

See pages 30 and 55.

DEPARTMENT OF ANALYTICAL AND APPLIED  
CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

- Copying from the flat, lettering.
- Descriptive Geometry in its application to plane sided solids.
- Orthographic (including isometric) and oblique projection.
- Model drawing.

## CHEMISTRY.

- General principles of chemistry.
- Elementary chemistry.
- Laboratory practice.

## MINERALOGY.

- Introductory course.

## MECHANICS.

- Statics and dynamics.

## PHYSICS.

- Heat.
- Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

- Introductory course.

## PRACTICAL ELECTRICITY.

- Introductory course.

## II. Year.

## CHEMISTRY.

- Inorganic and physical chemistry.
- Applied chemistry.
- Laboratory work in quantitative and qualitative analysis.

## MINERALOGY AND GEOLOGY.

- Elementary mineralogy and blowpipe practice.
- \*Physical geography, palæontology and geology.

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\* An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

Electricity.

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## MODERN LANGUAGES.

Students in this and the following years are expected to be able to read chemical books in French and German.

## VACATION WORK.

See pages 30 and 55.

## III. Year.

## CHEMISTRY.

Organic chemistry and chemical physics.

Applied chemistry.

Laboratory work.

## MINERALOGY AND GEOLOGY.

†Economic geology.

Blowpipe analysis and determinative mineralogy.

## METALLURGY.

Gold, silver, nickel, copper, lead.

## EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

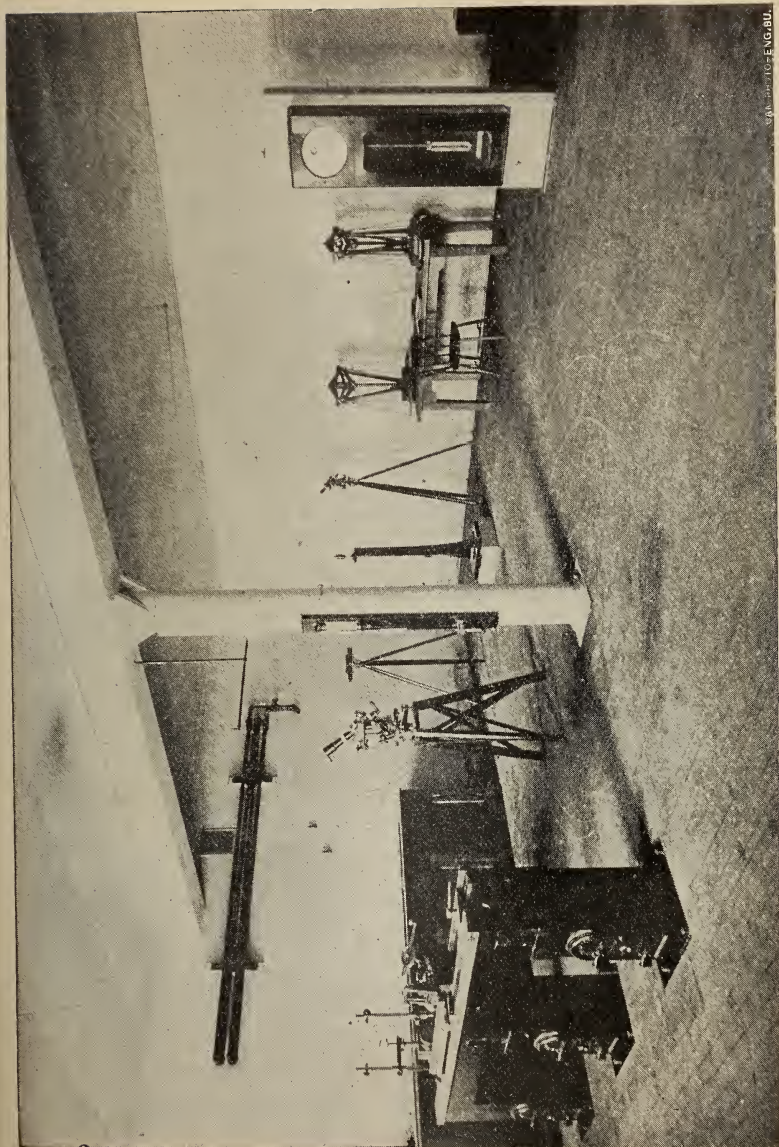
## BIOLOGY.

## VACATION WORK.

See pages 30 and 55.

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† An option is permitted between above subject and Physical Chemistry in the University of Toronto.

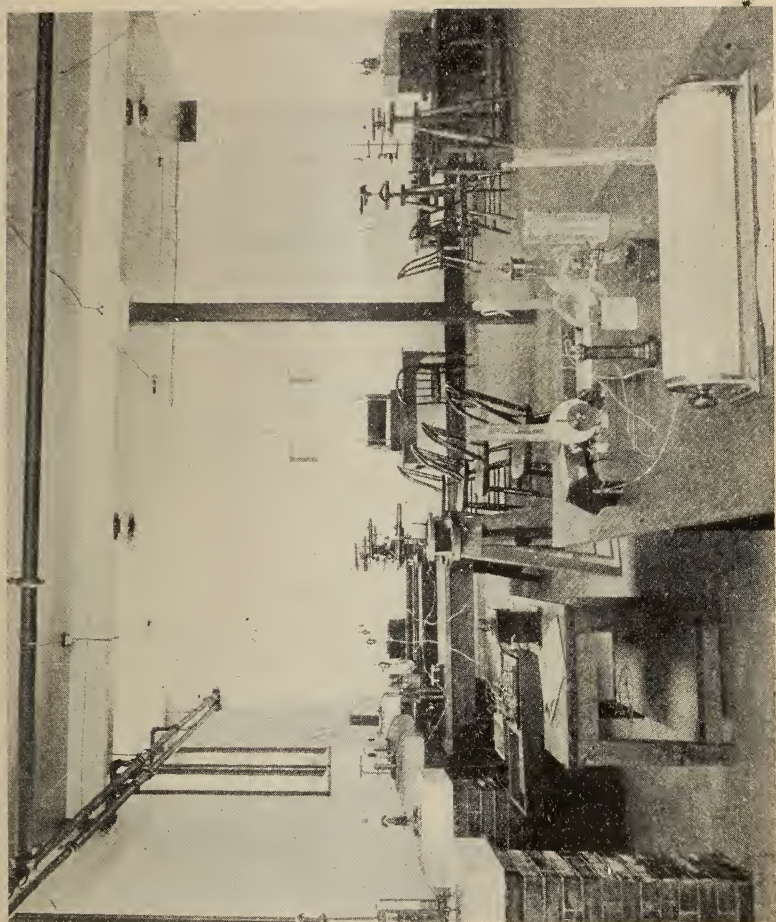


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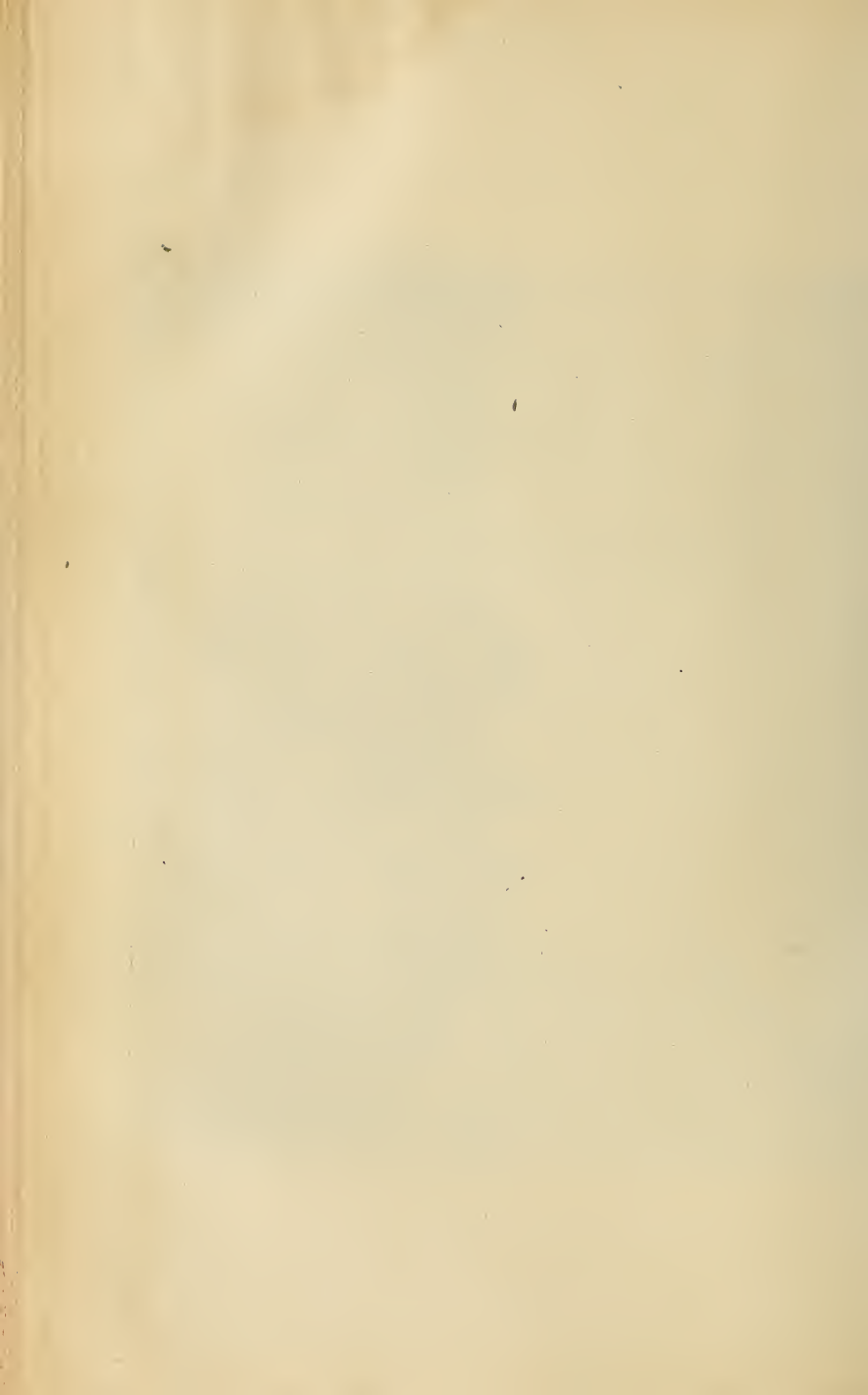
CLOCK ROOM.







GALVANOMETER LABORATORY.



## VACATION WORK.

### THESIS AND CONSTRUCTION NOTES.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next annual examination.

### CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—City Streets and Pavements.

“ THIRD YEAR.—Sewers and Sewerage Systems.

#### Books of Reference.

Byrne—Highway Construction.

Judson—City Roads and Pavements.

Shaler—American Highways.

Spalding—Roads and Pavements.

Rafter and Baker—Sewage Disposal in the United States.

### MINING ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

#### Books of Reference.

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-Shop.  
Practice.

“ THIRD YEAR.—Foundry Practice.

**Books of Reference.**

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

**ARCHITECTURE.**

For the Second year the following set of freehand pencil sketches is required :—

I. Doorway from the object.

II. Staircase “

III. Fireplace with cross section,

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

“ THIRD YEAR.—Twelve water-color studies.

**ANALYTICAL AND APPLIED CHEMISTRY.**

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid  
Manufacture.

“ THIRD YEAR.—Manufacture of Chlorine,  
Bleaching Powder and  
Caustic Soda.

**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

## THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of elective and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will

not be allowed to take less than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year ..... 900

Subdivided as follows :—

Work (reckoned in hours)..... 540 marks

Records (notes, drawings, etc.)..... 360 marks

FOR PASS.

The minimum percentages are :—

Work, 75 per cent ..... 405 marks

Records, 50 per cent ..... 180 "

And two-thirds of the total marks assigned 600 "



## FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statute of the University of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they affect the degree of B. A. Sc.

## DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations ;

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.
- 3 Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.
- 4 Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.
  - A. { Astronomy.  
Geodesy and Metrology.
  - B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
  - C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.

- D. { Mineralogy and Geology.  
 { Metallurgy and Assaying.

The sub-division "Inorganic and Organic Chemistry" will be obligatory on all candidates who select Group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent., of the marks assigned will be required.

5. The degree with honors will be conferred on candidates who obtain three out of the four honors possible, viz :

Certificates with honors . . . . . (cl. 2)

Thesis with honors . . . . . (cl. 3)

Honors in each subject of examination . (cl. 4)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in April.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of April.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis, drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate, and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate

## SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto.

*Be it enacted :*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degress be hereby established, viz.,  
Civil Engineer (C.E.), Mining Engineer (M.E.),  
Mechanical Engineer (M.E.), Electrical Engineer (E.E.)
- III. That the following be the conditions and regulations governing the conferring of the said degrees.
  1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause 11 hereunder.
  2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree
  3. Intervals of non-employment or of employment in other branches of engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
  4. Satisfactory evidence shall be submitted to the University Examiners as to the nature and length of the candidates professional experience for the purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidates may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the fifteenth day of April.
8. The candidate shall be required to present himself for examination in the month of April at such time as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the School of Practical Science.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.

For further particulars apply to the Registrar of the University of Toronto.

For the better carrying out of the provisions of the above statute the following statute constituting the Board of Examiners for professional degrees in Engineering was passed by the Senate on December 14th, 1900.

By the Senate of the University of Toronto—

*Be it enacted :*

1. That the Examiners for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), and Electrical Engineer (E.E.), be appointed at least twelve months in advance of the date of the examinations for which their services are required.
2. That the said Examiners constitute the Board of Examiners for degrees in Engineering.
3. That the members of the Board shall select one of their number to act as chairman, within one month from the date of their appointment.
4. That candidates for examination applying to the Registrar for information respecting the nature or details of the examinations for the said degrees, shall be directed by him to communicate with the chairman of the said Board, who shall forward to the candidates either directly or through the Registrar the decision of the Board.
5. That the Chairman of the said Board shall keep a record book in which he shall enter the minutes of the proceedings of the Board. He shall also keep a file in book form of all correspondence with candidates for examination and other official correspondence ; and shall at the close of the examination transmit to the Registrar a copy of the said minutes and correspondence.



6. That at the close of the examinations the Board shall forward a report of the results to the Registrar for transmission to the Senate. This report shall be signed by the Examiners or by the Chairman of the Board on their behalf.
7. That the Registrar shall furnish each Examiner on his appointment with a copy of this statute and a copy of the statute respecting degrees in Engineering.

**Extract from the Provincial Act Respecting Land Surveyors and  
Survey of Lands. (R.S.O.)**

“ 10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practicing Ontario Land Surveyor.

“ 14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practicing land surveyor duly filed as required by section 17 of this Act,

during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science or any school, college, or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practicing Ontario Land Surveyor."

**Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners is directed to the facilities afforded for preparation in the School.

**Extract from The Ontario Architects' Act.**

“ Any student who has matriculated in Arts in any University in His Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations

“ 23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

“ 24. — (3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

“ (4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Registrar upon payment of such fees as the council may by regulation direct.”

## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

### Subjects Taught by the Faculty of the School.

Subjects.	Instructors.
Organic and Inorganic Chemistry,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> W. H. Ellis, M.A., M.B., <span style="display: block; text-align: right;">Professor.</span>
Applied Chemistry,	
Assaying,	
Mineralogy and Geology,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> A. P. Coleman, M.A., Ph.D., <span style="display: block; text-align: right;">Professor.</span>
Petrography,	
Metallurgy,	
Mining and Ore-dressing,	
Milling,	
German,	
Statics,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> J. Galbraith, M.A., C.E., Professor. J. A. Duff, B.A., Lecturer. R. W. Angus, B.A.Sc., Lecturer. A. H. Harkness, B.A.Sc., Fellow. W. Monds, B.A.Sc., Demonstrator.
Dynamics,	
Strength of Materials,	
Theory of Construction,	
Machine Design,	
Compound Stress,	
Hydraulics,	
Thermodynamics and theory of the	
Steam Engine,	
French,	
Drawing,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> C. H. C. Wright, B.A.Sc., <span style="display: block; text-align: right;">Professor.</span>
Architecture,	
Plumbing, Heating and Ventilation,	
Mortars and Cements,	
Brick and Stone Masonry,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> J. A. Craig, B.A.Sc., Fellow.
Surveying,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> L. B. Stewart, D.T.S., Professor. A. T. Laing, B.A.Sc., <span style="display: block; text-align: right;">Demonstrator.</span>
Geodesy and Astronomy,	
Spherical Trigonometry,	
Least Squares,	
Descriptive Geometry,	
Electricity,	<div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">}</div> T. R. Rosebrugh, M.A., Professor. W. G. Chace, Grad. S.P.S., <span style="display: block; text-align: right;">Fellow.</span>
Magnetism,	
Dynamo-Electric Machinery,	
Theory of Mechanism,	
Mechanics of Machinery,	
Rigid Dynamics.	

## Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy,	<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">}</div> <div>           Alfred Baker, M.A., Professor.            A. T. DeLury, B.A., Lecturer.            E. F. Burton, B.A., Fellow.         </div> </div>
Sound, Eight, Heat, Electricity and Magnetism, Hydrostatics.	<div style="display: flex; align-items: center;"> <div style="font-size: 4em; margin-right: 10px;">}</div> <div>           James Loudon, M.A., L.L.D.  <div style="text-align: right;">Professor.</div>           W. J. Loudon, B.A.,  <div style="text-align: right;">Demonstrator.</div>           C. A. Chant, B.A. Lecturer.            J. C. McLennan, B.A., Ph.D.  <div style="text-align: right;">Demonstrator.</div>           G. R. Anderson, M.A., Assistant.            J. S. Plaskett, B.A., Assistant.         </div> </div>
Biology.	R. Ramsay Wright, M.A., Professor.

Text-books for the first year marked (*a*) ; second year (*b*) ; third year (*c*) and for fourth or post-graduate year (*d*).

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid) ; orthographic, oblique and perspective projections ; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

## Text Books and Books of Reference.

Angel—Plane and Solid Geometry.

Binn—Orthographic Projection.

Church—Descriptive Geometry (*a*), (*b*).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*).

Vere Foster—Copy Book No 10 (*a*).

Warren—Stone Cutting (*c*).

Worthen—Topographical Drawing.

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

Chain surveys.

Compass and theodolite surveys.

Method of keeping field notes.

Determination of heights and distances.

Plotting.

## LEVELLING.

Longitudinal and cross sections.

Plotting.

## SETTING OUT.

Setting out straight lines and curves.

Setting out levels.

## MENSURATION.

Lines, surfaces and solids.

Timber, masonry, iron and earthwork.

Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

## Text Books.

Brough—Mine Surveying (*b*), (*c*).

Gillespie—Higher surveying (*b*), (*c*), (*d*).

Henck or Searle—Railway Curves (*b*), (*c*).

Johnson—Theory and Practice of Surveying.

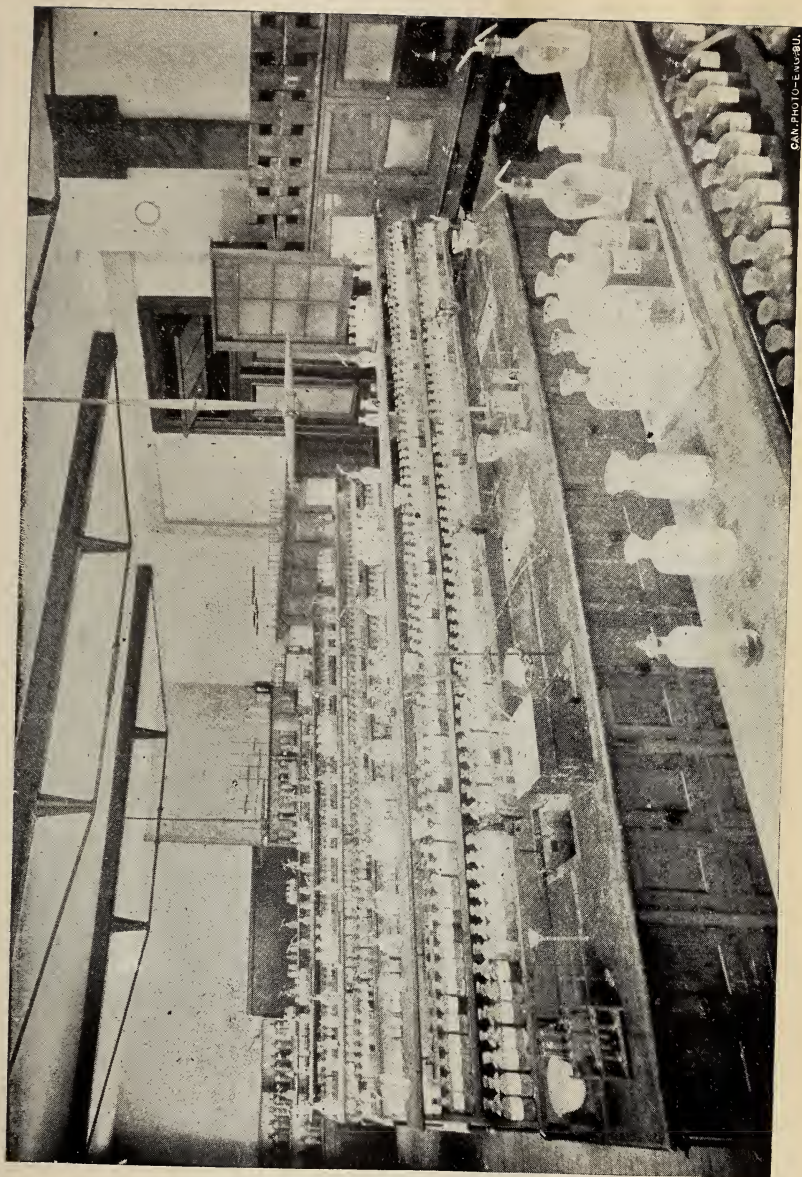
Murray—Manual of Land Surveying(*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

## ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

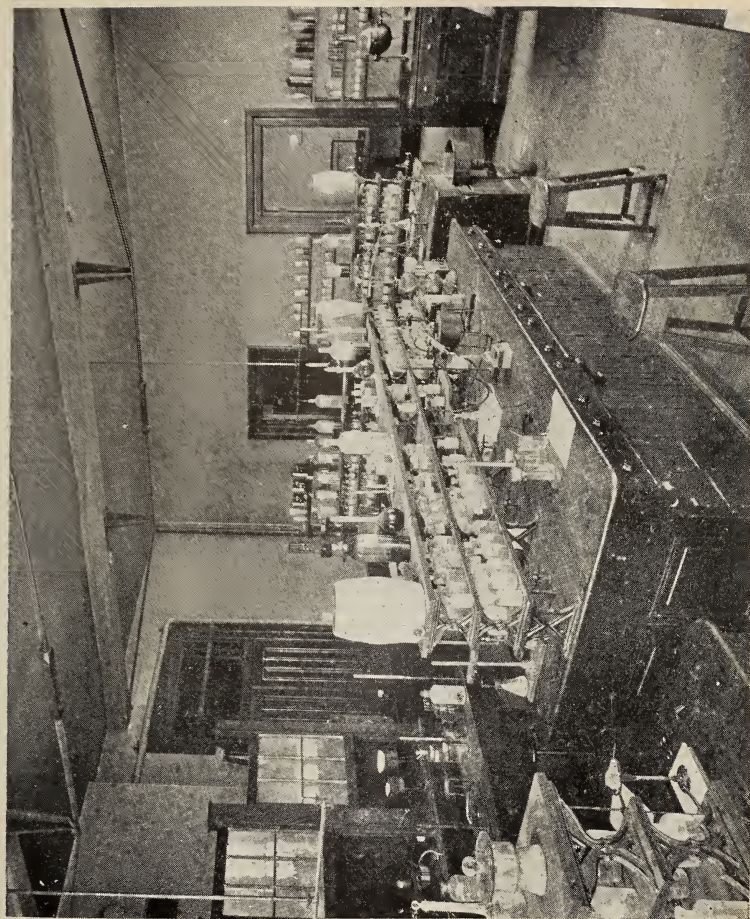




CAN. PHOTO-ENG. CO.

CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.





CHEMICAL LABORATORY—QUANTITATIVE ANALYSIS.





In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map construction are based upon the supposition that the earth is a sphere.

#### ADVANCED COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors. It is distinguished from the work of the ordinary course not so much by the subjects as by the degree of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

#### Text-Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher Surveying (*b*), (*c*), (*d*).

Gore—Elements of Geodesy (*c*), (*d*).

Green—Spherical and Practical Astronomy (*c*), (*d*).

Helmert—Höhere Geodäsie.

Nautical Almanac, 1902 (*c*), (*d*).

#### APPLIED MECHANICS.

##### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—  
arches, retaining walls, roofs, bridges, etc.

DYNAMICS.

Representation and measurement of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc., etc.

STRENGTH OF THE PARTS OF MACHINES.

MACHINE DESIGN—

HYDRAULICS.

Discharge of water through orifices, notches, etc.

Flow in pipes and open channels. Sewerage, water-works, water-power. water-wheels turbines, pumps, etc.

THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

#### Text-Books and Books of Reference.

Baker—Masonry Construction (*d*).

Billings—Heating and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc. (*d*).

Carnegie - Pocket Companion.

Carpenter—Heating and Ventilation of Buildings (*c*),

“ Experimental Engineering (*d*).

Du Bois - Graphic Statics.

“ Strains in Frames Structures.

Gerhardt—House Drainage and Sanitary Plumbing (*c*).



Greene—Trusses and Arches.

Innes—Centrifugal Pumps, Turbines and Water Motors  
(*d*).

Johnson—Modern Framed Structures (*c*), (*d*).

“ Materials of Construction (*d*).

Kennedy—Mechanics of Machinery (*b*), (*c*).

Kidder—Building Construction and Superintendence.

“ Architect and Builders' Pocket Book.

Lanza—Applied Mechanics.

Low and Bevis—Machine Drawing and Design (*b*), (*c*).

Low—Machine Drawing (*a*), (*b*), (*c*).

Merriman and Jacoby—Roofs and Bridges.

Merriman—Mechanics of Materials (*b*), (*c*), (*d*).

“ Hydraulics (*c*), (*d*).

Patton—Foundations (*d*).

Peabody—Thermodynamics (*d*).

“ Steam Tables (*d*).

Rafter and Baker—Sewage Disposal in the United  
States.

Rankine—Applied Mechanics (*c*), (*d*).

Reuleaux—The Constructor.

Santo Crimp—Sewage Disposal Works.

Shann—Elementary Treatise on Heat (*c*), (*d*).

Trautwine—Engineer's Pocket Book.

Unwin—Elements of Machine Design (*c*).

“ Testing of Materials of Construction.

Von Ott—Graphic Statics (*a*).

Williamson—Elasticity (*d*).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

**Text-Books and Books of Reference.**

Auchincloss—Valve and Link Motions (*c*).

Goodeve—Elements of Mechanism (*b*).

Halsey—Slide Valve Gears.

Kennedy—Mechanics of Machinery (*b*), (*c*).

Rankine—Machinery and Millwork.

Reuleaux—Kinematics of Machinery.

**ELECTRICITY.**

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises—

**ELEMENTARY ELECTRICITY AND MAGNETISM.****MEASURING INSTRUMENTS—**

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc, etc.

**MATHEMATICAL THEORY OF ELECTRICITY.****APPLICATIONS OF ELECTRICITY—**

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting ; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

**THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.****Text-Books and Books of Reference.**

Bedell & Crehore—Alternating Currents.

Carhart & Patterson—Electrical Measurements (*b*), (*d*).

Bedell—Principles of the Transformer (*d*).

Fleming—Alternate Current Transformers, Vols. I and II (*d*).

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe - Electrical Testing (*b*).

Loudon & McLennan—Practical Physics (*b*).

Stewart & Gee—Practical Physics.

Thompson, S. P.—Elementary Electricity and Magnetism.

“ —Dynamo Electric Machinery.

“ —Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE—

Egyptian, Assyrian and Persian.

Classic.

Romanesque and Byzantine.

Gothic.

Renaissance.

### ORDERS OF ARCHITECTURE.

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

### Text Books and Books of Reference.

Fergusson—History of Architecture.

Fletcher—A History of Architecture.

Gwilt.—Encyclopædia of Architecture.

Leeds—Orders of Architecture (*b*).

Osborne—Art of House Planning (*d*).

Owen Jones—Grammar of Ornament.

Racinet—L'Ornament Polychrome.

Rickman—Gothic Architecture.

Sharpe—Seven periods of Church Architectur .

Smith, T. Roger—Classic and Early Christian Architecture (*a*), (*b*).

Smith, T. Roger—Gothic and Renaissance (*c*).

Statham—Architecture for General Readers.

Sturgis—European Architecture.

Vignole—The Five Orders of Architecture (*b*), (*c*).

### MATHEMATICS AND PHYSICS.

The pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

#### Text-books and Books of Reference.

Ganot—Physics (*b*).

Hall & Knight—Plane Trigonometry (*a*).

Loomis—Calculus (*b*).

Loudon & McLennan—Practical Physics (*b*).

Mackay—Elements of Euclid (*a*).

Newcombe & Holden—Astronomy (*b*).

Osborne—Calculus.

C. Smith—Conic Sections (*a*).

Hamblin Smith—Hydrostatics (*b*).

Balfour Stewart—Heat.

Todhunter—Algebra (*a*).

“ —Spherical Trigonometry (*b*).

Tyndall—Sound.

### CHEMISTRY.

#### COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

Elementary chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

## COURSES IN THE UNIVERSITY OF TORONTO.

Inorganic chemistry.

Organic chemistry.

Chemical theory.

Physical chemistry.

## Text Books and Books of Reference.

Allen—Commercial Organic Analysis.

Arnold—Steel Works Analysis.

Beilstein—Organic Chemistry.

Beringer—Text Books of Assaying.

Blair—Chemical Analysis of Iron and Steel.

Bloxam—Chemistry.

Bloxam &amp; Blount - Chemistry for Engineers and Manufacturers.

Blyth, A. W.—Poisons.

“ —Foods.

Bolley—Handbuch der Chemischen Technologie.

Dammer—Handbuch der Anorganischen Chemie.

Douglas &amp; Johnson—Qualitative Analysis.

Fresenius—Qualitative and Quantitative Analysis.

Furman - Manual of Practical assaying.

Hempel—Gas Analysis.

Jones—Practical Chemistry.

Lehfeldt—Physical Chemistry.

Lord—Notes on Metallurgical Analysis.

Lunge—Sulphuric Acid and Alkali.

“ —Coal Tar and Ammonia.

Meyer - History of Chemistry.

Newth—Manual of Chemical Analysis,

Ostwald—Lehrbuch der Allgemeinen Chemie.

“ —Outlines of General Chemistry.

Pattison Muir—Thermo-chemistry, elements of.

Post—Chemisch-technische Analyse.

Remsen—Inorganic and Organic Chemistry.

Richter—Inorganic and Organic Chemistry

Roscoe &amp; Schorlemmer - Treatise on Chemistry.

- Sadtler—Organic and Applied Chemistry.  
Sutton—Volumetric Analysis.  
Thorp—Outlines of Industrial Chemistry.  
Thorpe—Dictionary of Applied Chemistry.  
Thorpe—Quantitative Analysis.  
Wagner—Chemical Technology.  
Walke—Lectures on explosives.  
Watt—Dictionary of Chemistry.  
Wiechmann—Sugar Analysis.  
Winkler—Gas Analysis.

### MINERALOGY, GEOLOGY AND METALLURGY.

1. Mineralogy and Geology.
  - Mineralogy and crystallography.
  - Geology and palæontology.
  - Petrography.
  - Physical geography.
  - Blowpipe analysis.
  - Determinative mineralogy.
2. Mining and Metallurgy.
  - Mining Geology.
  - Ore dressing.
  - Metallurgy of iron and steel.
  - Metallurgy of nickel, copper, silver, etc.
  - Assaying.
  - Milling.

### Text Books and Books of Reference.

- Chapman or Brush—Mineral Tables.  
Chapman—Mineralogy and Geology of Canada.  
Crosby—Determination of Minerals.  
Dana—Manual of Geology.  
Furman—Assaying.  
Geikie—Text-Books of Geology.  
Harker—Petrography  
Howe—Metallurgy of Steel.  
Ihlseng—Manual of Mining.  
Kemp—Handbook of Rocks.



Kemp—Ore Deposits of the United States.  
Kuhnhardt—Ore Dressing.  
Nicholson—Palæontology.  
Peters—Modern Copper Smelting.  
Phillips—Ore Deposits.  
Phillips and Bauerman—Elements of Metallurgy.  
Plattner—Manual of Blowpipe Analysis.  
Roberts-Austen—Metallurgy.  
Rose—Metallurgy of Gold.  
Rosenbusch—Petrography.

### EXCURSIONS.

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years. The excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

### STEAM ENGINE LABORATORY.

The equipment of this department is as follows :

A Babcock and Wilcox 52 h. p. boiler.

A Harrison-Wharton 12 h. p. boiler.

A 50 h. p. Brown engine. This engine was constructed specially for experimental investigations. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser, the latter of which was kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers. In addition there are the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers, anemometers, thermometers, a platinum and platino-rhodium thermo-couple, etc., etc.

### HYDRAULIC LABORATORY.

This laboratory contains two large steel tanks arranged for the experimental study of the flow of water through orifices and over weirs. Both orifices and weirs may be conveniently changed.

The discharge is measured by two tanks which are filled and emptied alternately by means of four valves operated by a single lever, thus enabling the measuring to be continued for any length of time without interrupting the flow.

The water is supplied by a three-throw pump with double acting cylinders, having a capacity of 500,000 gallons per 24 hours.

For the work on turbines, etc., a six-inch new American turbine, the gift of the firm of William Kennedy & Sons, Owen Sound, has been set up so that efficiency determinations under different gate openings and heads may be made. In addition to this a thirty-six inch axial impulse turbine, a Pelton wheel, and a centrifugal pump are set up so that they may be experimentally investigated.

A Venturi meter has also been installed, and apparatus has been arranged so that the discharge from different forms of nozzles, and the frictional losses in elbows, valves, etc., may be determined.

There are the usual measuring instruments, gauges, gauge-testing apparatus, scales, brakes and dynamometers, and a nine-inch McCormick turbine.

### STRENGTH OF MATERIALS LABORATORY.

The machines in this department are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 10-ton universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity adapted to specimens up to forty-eight inches in length.

A Riehle abrasion machine, for testing the resistance to attrition of stones, brick, etc.

Extensometers of the Bauschinger, Unwin, Marshall and other types besides a large number of micrometers and scales.

The shop is equipped with a number of high-class machine tools specially fitted for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs and for making special apparatus for original investigation.

### CEMENT TESTING LABORATORY.

This department is fitted with all the usual molds, gravimeters, tables and tank accommodation necessary in a well equipped laboratory.

In this laboratory there are also the following :

A Riehle 2,000-pounds machine; fitted for either tension or compression.

A Riehle 600-pounds machine fitted for tension only.

An extra large Faija's hot bath apparatus.

### METROLOGICAL LABORATORY.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length; a 10-foot Rogers comparator with a graduating attachment; a Kater's pendulum with vacuum chamber; a Howard astronomical clock and electro-chronograph; a sidereal chronometer, a Troughton & Simms 15-inch theodolite, eight surveyor's transits, seven levels, compasses, sextants, plane tables,

micrometers, planimeters, etc. ; and all the necessary field instruments.

### ELECTRICAL LABORATORY.

In one section of this laboratory a 20 kilo-watt Edison motor furnishes power to drive several continuous current dynamos, series, shunt, and compound wound, bipolar and multipolar, a Westinghouse experimental alternator, and a rotary converter when used as a polyphase dynamo. Of direct current motors, besides the one already mentioned, there are a Crocker-Wheeler machine and a 6 h.p. Edison motor, used in the mill-room, but available for testing ; besides fan motors. Of alternating current motors there are a General Electric three-phase induction motor and a single-phase induction motor, besides a special experimental polyphase induction motor of 7 1-2 h.p., now being built by the same company, in which the rotor terminals are all separately accessible. It is expected that another alternating current motor will, with some other equipment, be ready by October. There is also a pair of polyphase rotary converters, either of which may be used as dynamo or motor driven by the other. Other types are represented by fan motors. A marble switchboard in this room facilitates connection between different circuits, both locally and for other parts of the building. It is supplied with 110 and 220 volts, direct current, and the same voltage of alternating current of 60 cycles from the city circuits, in addition to the range of supply that may be had from our own generators and storage cells. Four switches which may be connected in any of the circuits, two sets of bus-bars for paralleling, automatic circuit breakers, arc and incandescent lamp circuits, and four controlling rheostats are also connected to the switchboard.

Another section is the galvanometer room, in which are ten masonry piers to support instruments in such a way as to be free of vibration.

An adjoining room is the laboratory for advanced work, in which may be mentioned a Kelvin Balance and its rheostat, and an enclosure within which experiments with high voltages may be safely performed. Marble switchboards are placed in this room, and in the galvanometer room to connect with "Chloride" storage batteries of large and small cells located on a gallery in a separate room, and apparatus for convenience in standardizing measuring instruments is available.

Among the instruments and apparatus may be mentioned: Numerous D'Arsonval galvanometers of Carpentier, Rowland and other designs, ballistic galvanometers, a Thomson galvanometer, telescopes and scales, divided microfarad condenser, Kempe discharge key, rheostats and proportional arms for Wheatstone bridge and other purposes, slide wire metre bridges, including special bridge for electrolytic resistance; standard resistances, including megohm, 10 ohms, several copies of the ohm, divided ohm, and a complete set of standards from one hundred thousand ohms down to one thousandth ohm, certified by the Charlottenburg Reichsanstalt, the latter with oil bath and stirrer; Willyoung potentiometer, standard cells, Clark and Helmholtz, Kohlrausch tubes for measurement of electrolytic resistance, Lippmann electrometers, Kelvin-Mascart electrometer, Nernst electrometer. Besides these, are numerous Weston instruments including wattmeters, voltmeters for direct and alternating current, ammeters, and milliammeters, Thomson and Whitney ammeters and voltmeters, three Siemens electro-dynamometers, Kelvin balance, Kelvin high potential electrostatic voltmeter, and electrostatic multicellular voltmeter; Thomson recording wattmeters (including one for three phase), Shallenberger recording ammeter; lightning arresters, Westinghouse, Stanley, Wagner and Thomson-Houston transformers; a General Electric 10,000 volt testing transformer, and a low voltage 1,000 ampere transformer, high



potential condenser, Wimshurst influence machine, Ruhmkorff coils, Crooke's tubes, fluoroscope, wireless telegraph apparatus; Hopkinson permeameter for testing the magnetic qualities of iron, instruments for measuring instantaneous current and voltage in alternating current circuits according to Duncan, Fessenden contact maker, earth inductor, Ayrton and Perry secohmmeter, fixed and variable standards of inductance, double sets of telegraph and telephone apparatus; Lummer-Brodhun and Bunsen photometers with accessories for arc and incandescent light photometry and Hefner standard amyl-acetate lamp (these however are not as yet set up). Voltmeters of all the usual forms, balances, thermometers, portable rheostats and numerous minor appliances complete this portion of the equipment. Among arc lights may be mentioned the Manhattan, Upton, Adams-Bagnall, Toerring, Thomson, Safford and United Electric long burning enclosed arcs, Thomson and other lamps for alternating current, the Ward and Universal (two in series of 110 volt circuits). Thomson-Houston and Ball for series circuits, and one the gift of W. A. Turbayne.

#### MINERALOGICAL LABORATORY.

This laboratory contains a collection of hand specimens of minerals and rocks for the purpose of training students in handling and becoming familiar with the more common varieties of both; it is also provided with balances for determining the specific gravity of minerals.

Blow pipe instruction is given here, there being seating room, blow pipe burners and accommodation for thirty-six students working at once.

#### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two Brown coke furnaces for crucibles and muffles, two pulverizers, a muller, and all



other necessary appliances for pulverizing and preparing ores for fire assay. The pulp balances for weighing charges and the delicate balances for weighing gold and silver buttons are kept in a room opening off the assay laboratory. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope; also the necessary appliances for making rock sections by hand. Six petrographical microscopes are reserved for the use of advanced students in lithology.

#### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silver copper plates, and a Frue Vanner. The concrete floor of the mill-room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8 horse power Edison motor, which is supplied with current from the city circuit. The mill-room is also provided with settling tanks for the tailings and concentrates, a pair of Hamilton rolls for dry crushing, and an automatic sampler.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill-room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a large brick assay furnace and a reverberatory furnace for roasting sulphide and arsenical ores; leaching vats for treating ores by the cyanide process, and a chlorination barrel.

## CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

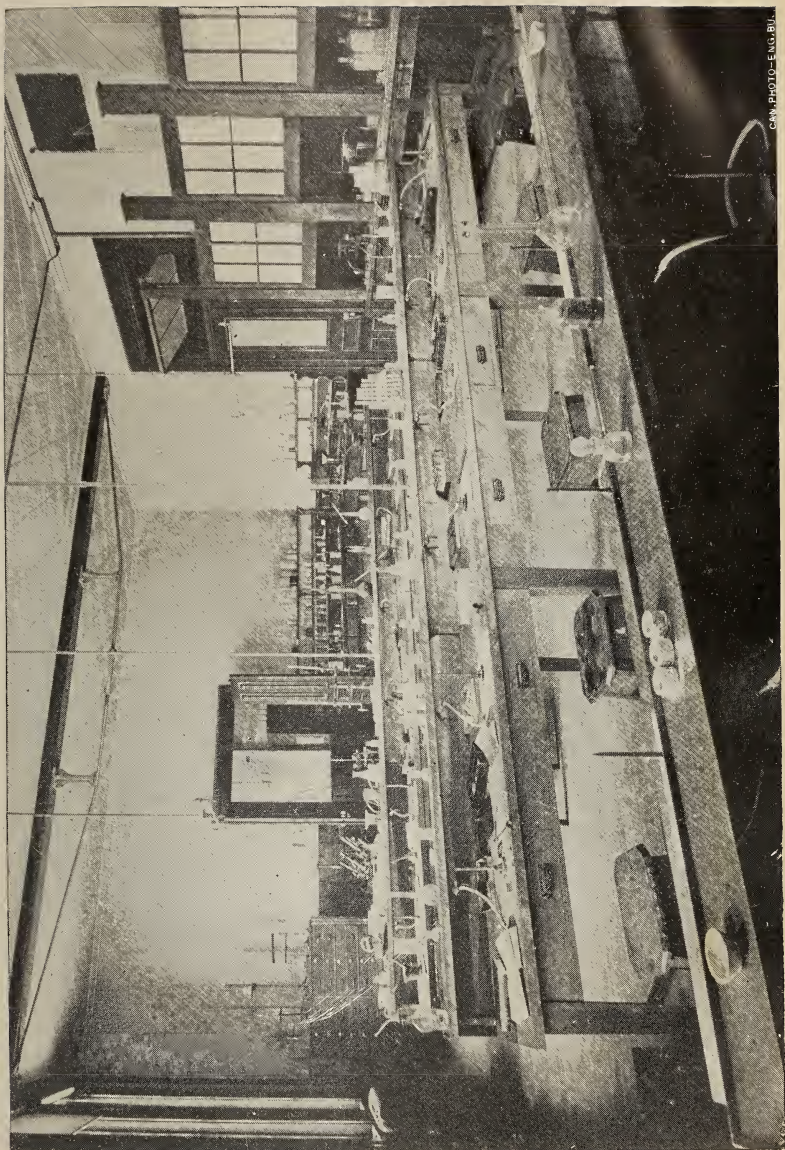
The Quantitative Laboratory will accommodate about 20 students. It is furnished with convenient work tables, and fume cupboards, and supplied with the most recent apparatus for gravimetric, volumetric and gasometric analysis, both scientific and technical. Besides balances by the best makers, and of the most recent construction, furnaces for fusion, organic analysis, etc., and all the requisites for the assay of ores, furnace and other technical products in the wet way, the apparatus includes an experimental vacuum pan, a filter press, the latest forms of Fischer's, Mahler's, Junker's and Carpenter's apparatus for the determination of the heating power of fuel, facilities for the electrolytic determination of metals, including a Gulcher thermo-electric pile; spectrosopes, polarscopes and microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

In addition there is also a laboratory for gas analysis and calorimetric work.

## PHYSICAL LABORATORY.

University of Toronto.

The physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which

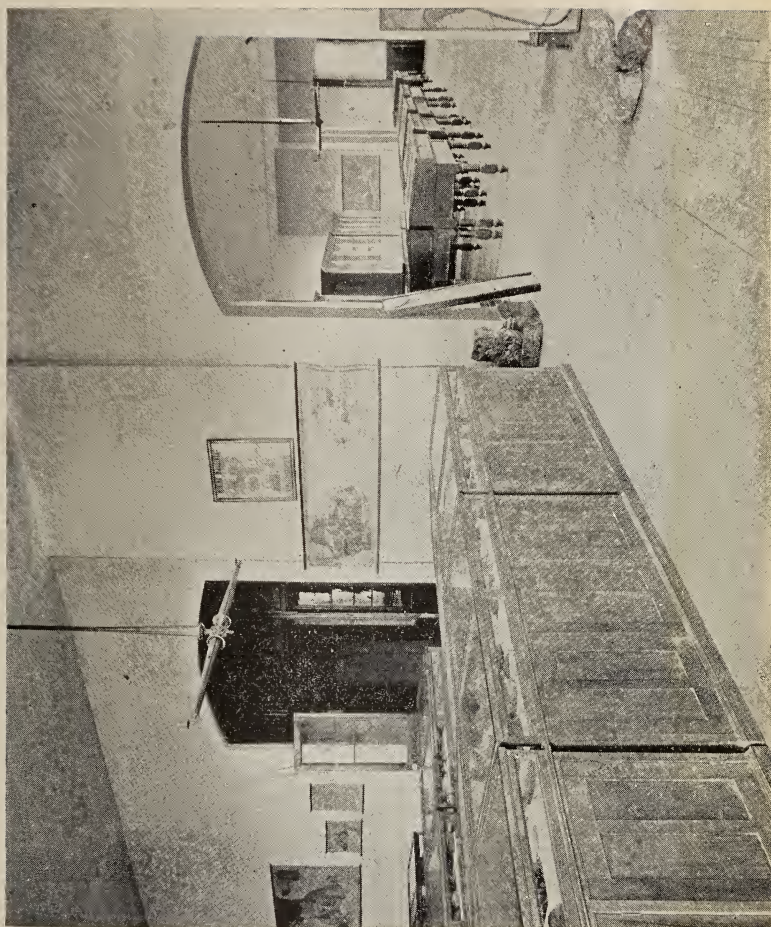


GEN. PHOTO—ENG. BU.

BLOWPIPE LABORATORY.



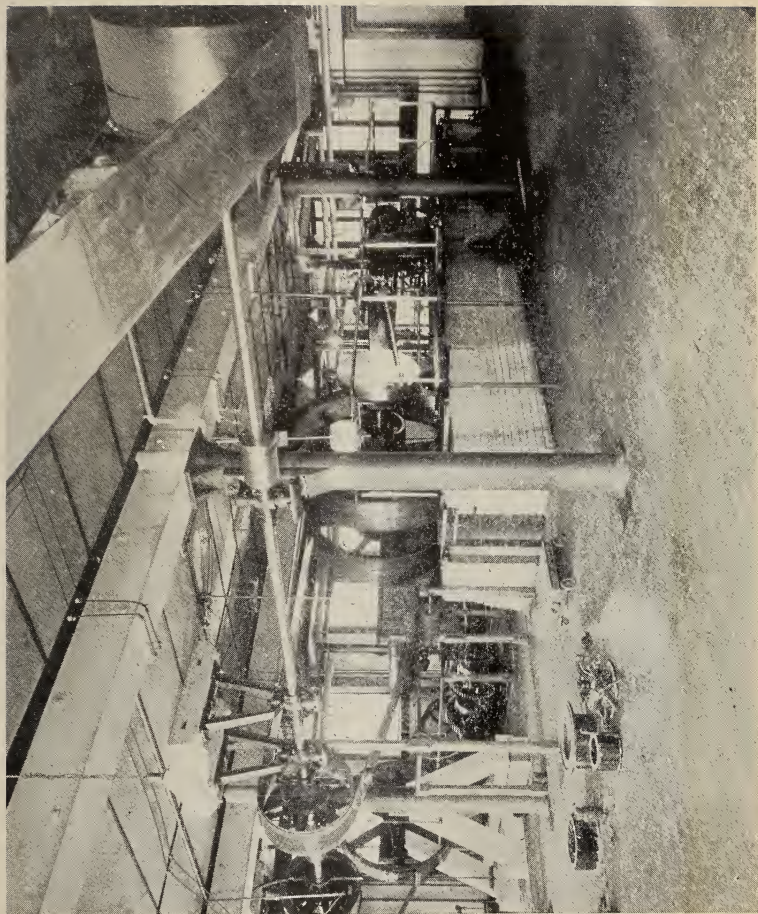




MINERALOGICAL COLLECTION.

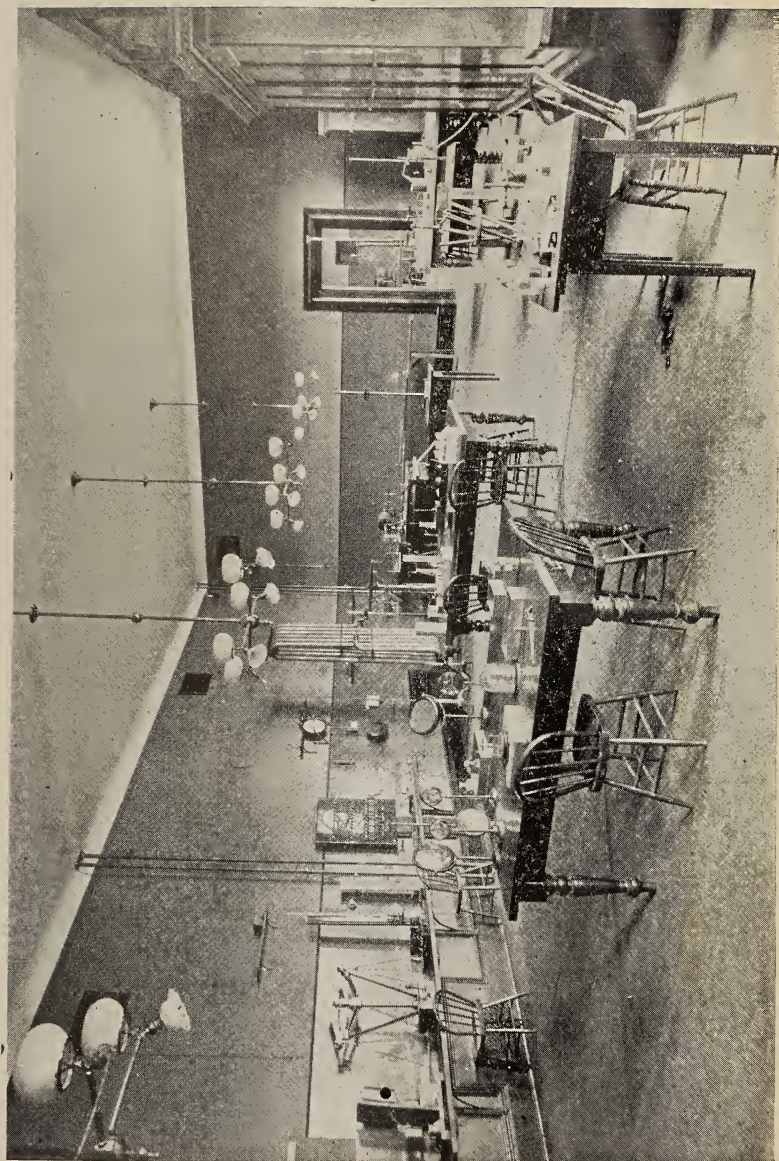






EXPERIMENTAL ENGINE.





ELEMENTARY PHYSICAL LABORATORY (UNIVERSITY OF TORONTO).





offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc

### MUSEUMS.

The Geological Museum includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes ; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the Province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged<sup>2</sup> in two collections, one a large general collection from foreign localities, containing massive schistose and sedimentary rocks ; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The palæontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

### LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference in the subjects of study pursued in the school has been formed and is being added to year by year.

#### LIST OF DONORS TO THE LIBRARY.

- American Society of Civil Engineers—Proceedings.
- Association of Engineering Societies—Journal.
- Blackwood, A. E.—Stone.
- Bureau of Mines—Report.
- Canadian Mining Institute—Journal.
- Columbia University—Quarterly.
- Department of Mines, Nova Scotia—Report.
- Geological Survey of Canada—Report.
- Gzowski, Estate of the late Sir Casimir—
  - Transactions of American Society of Civil Engineers, 1874-1898.
  - Transactions of Canadian Society of Civil Engineers, vol. I., 1887—vol. XII., 1898.
  - Proceedings of The Institution of Civil Engineers, vol. LXIII., 1880—vol. CXXXII., 1898.
- Institution of Engineers and Shipbuilders in Scotland—Transactions.
- Institution of Junior Engineers—Transactions.
- Institution of Mechanical Engineers—Proceedings.
- Royal Institute of British Architects—Journal and Proceedings.
- Society of Chemical Industry—Journal.
- Société des Ingénieurs Civils de France—Mémoires.
- United States Coast and Geodetic Survey—Report.
- United States Government Tests of Metals, etc.—Report.
- University of Toronto—Studies.



## THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

Officers for 1901-1902.

<i>President</i> .....	D. Sinclair.
<i>Vice-President</i> .....	E. A. James.
<i>Recording Secretary</i> .....	T. C. Irving.
<i>Treasurer</i> .....	F. N. Rutherford.
<i>Corresponding Secretary</i> .....	D. H. Pinkney.
<i>Editor</i> .....	To be appointed.
<i>Librarian</i> .....	F. A. Gaby.
<i>Assistant Librarian</i> .....	P. C. Coates.
<i>Graduates' Representative</i> .....	A. A. Wanless.
<i>Fourth Year do</i> .....	J. F. S. Madden.
<i>Third Year do</i> .....	H. F. White.
<i>Second Year do</i> .....	J. M. Wilson.
<i>First Year do</i> .....	To be elected.

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society publishes a pamphlet annually, containing the best papers read at the meetings.

### LODGING AND BOARD.

Accommodation is readily obtainable in numerous private boarding-houses within convenient distance of the School, at a cost of from three dollars upwards for comfortable lodging with board; or rooms may be rented at a cost of from one dollar per week upwards, and board obtained separately at moderate rates. A list of accredited boarding houses is kept by the Secretary of the University College Young Men's Christian Association, and students are recommended to consult him with reference to the selection of suitable accommodation.

### GYMNASIUM AND ATHLETIC GROUNDS.

(From the Calendar of the University of Toronto.)

"The University Gymnasium was completed and equipped in 1893. It is fully provided with the best and most

modern appliances for physical culture, and contains a running track, shower baths and swimming bath, besides the necessary dressing-rooms and other conveniences. A competent instructor in Gymnastics is in constant attendance to superintend and direct the exercises of students. In addition to the lawn in front of the main University Building and the campus in the rear, a large plot of ground on Devonshire Place has been prepared and set apart as an Athletic Field. By this addition the facilities for football, cricket, tennis and other out-door athletic sports are doubled, as compared with previous accommodation ; and by these grounds, in conjunction with the Gymnasium, ample opportunity is afforded to all students for healthful exercise and physical development. To assist in meeting the expenses of the Gymnasium, a nominal annual fee is imposed on those who avail themselves of its advantages. The supervision of all athletic matters has been intrusted by the Councils to an Athletic Board, consisting of six members appointed from the Faculty and the officers of the Athletic Association. All application of clubs for the use of grounds must be made annually to this Board. All such application must be accompanied by a list of officers. In the case of new clubs, the list of officers must be accompanied by particulars as to the organization and objects of the club making application. ”

## ATHLETIC ASSOCIATION.

### DIRECTORATE.

*(From the Calendar of the University of Toronto.)*

Pres.—President Loudon, L.L.D.

Vice.-Pres.—V. E. Henderson B. A.

Sec.-Treas.—R. M. Millman, B. A.

Dir.—Professor McCurdy. Dir.—Rev. D. B. Macdonald.

“ E. R. Paterson.

“ F. H. Broder.

“ W. B. Hendry.

“ C. L. Wilson.

Dir.—Professor C. H. C. Wright.

The athletic association is now the paramount body in University Athletics, and has entire jurisdiction over the athletic clubs using the University name, and over their finances, members, and policy subject to the University authorities. Henceforth no financial agreement can be entered into by any such club without the sanction of the Directorate. No expenditure of any kind in connection with any such club can be made without the written order of the Secretary-Treasurer of the Directorate.

### STUDENT'S UNION BUILDING.

*(From the Calendar of the University of Toronto.)*

“ In 1894, additions were made to the front of the building in which the Gymnasium is situated, consisting of a large hall for public meetings, a reading room and committee rooms. This additional accommodation is available for the work of the various student societies and for academic purposes. Applications for the use of rooms, accompanied by a list of officers and a copy of the constitution of the society making application, must be made, through the President, to the joint committee of the Councils on Gymnasium and Students' Union Building, at the beginning of the season, or from time to time as occasion requires. Arrangements have also been made by which recognized societies may obtain the use of committee-rooms on application to the janitor of the Students Union Building.

### RUGBY FOOTBALL.

The Mulock Cup, which was presented by the Hon. Wm. Mulock, M.A., L.L.D., to the University of Toronto Rugby Foot-ball Club for inter-college competition, brings out each year a large number of contestants from the University and affiliated colleges.

## Rugby Football Club of the School of Practical Science.

## OFFICERS.

Hon. President.....	Principal Galbraith.
President .....	W. G. Campbell.
Sec.-Treas.....	H. F. White.
Manager of senior team.....	R. Cumming.
Captain of senior team.....	A. E. Gibson.
Manager of junior team.....	H. W. Evans.
Captain of junior team.....	R. H. Bryce.

## LIST OF PLAYERS.

## SENIOR TEAM.

Bonnell, M. B.	Harvey, C.
Burwash, N. A.	Lang, A. G.
Campbell, W. G.	Madden, J. F. S.
Campbell, A. R.	McLennan, A. L.
Cumming, R.	Ross, R. B.
Gibson, A. E. (Capt.)	Small, H. S.
Gzowski, H. N.	White, F.
Harcourt, F. Y., B A	

## JUNIOR TEAM.

Baldwin, F. W.	Laing, P. A.
Beatty, H. E.	Mills, J. E.
Bryce, R. A. Capt.)	Morden, L. W.
Burnham, F. W.	Ramsey, G. L.
Evans, H. W.	Reynolds, G. B.
Fee, T.	Rutherford, F. N.
Fleck, J. G.	Sauder, P. M.
Fletcher, H. M.	Yates, M.
Jermyn, P. V.	

## ASSOCIATION FOOTBALL.

In order to encourage Association Football on the College Campus, the Faculty of the University of Toronto presented a cup, known as the Faculty Cup, to the Inter-College Association Football Club for annual competition among the University and affiliated colleges.

## Association Football Club of the School of Practical Science.

## OFFICERS.

Hon. Pres. ....	C. H. C. Wright, B.A. Sc.
President .....	W. H. Young.
Sec.-Treas .....	W. G. Campbell.
Captain. ....	H. S. Small.
Manager .....	B. B. Patten.

## COMMITTEE.

IV. Year Representative .....	R. H. Barrett.
III.   "               "               .....	A. E. Gibson.
II.   "               "               .....	C. Williams.
I.   "               "               .....	J. E. Mills.

## LIST OF PLAYERS.

Barrett, R. H.	Mills, J. E.
Bridgland, M. P., B.A.	Oliver, J. P.
Campbell, W. G.	Patten, B. B.
Connor, A. V.	Robinson, L.
DeCew, J. A.	Rutherford, F. N.
Gibson, A. E.	Small, H. S. (Capt.)
Heron, J. B.	Thompson.
Keefe, W. S. H.	Whelihan, J. A.

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## HOCKEY.

The trophy which is competed for annually among the Colleges in Hockey is known as the Jennings Cup, and is the gift of W. T. Jennings, Mem., Inst. C. E., Consulting Engineer.

## Hockey Club of the School of Practical Science.

## OFFICERS.

Hon. President .....	Dr. Ellis.
President . . . . .	W. G. Campbell.
Vice-President .....	W. Elwell.
Sec. and Treas. ....	C. L. Coulson.
Manager Senior Team .....	R. Cumming.
Captain Senior Team ....	A. G. Lang.
Manager Junior Team .....	H. S. Southworth.
Captain Junior Team .....	J. E. Mills.

## LIST OF PLAYERS.

## SENIOR TEAM.

Challies, J. B.	Marrs, C. H.
Coulson, C. L.	Nevitt, T. H.
Johnston, H.	Pace, J. D.
Lang, A. G.	Patten, B. B.

## JUNIOR TEAM.

Field, J. J.	Pace, J. D.
Ford, A. L.	Pardoe, W. S.
Jackson, E. R.	Schell, E. S.
Mills, J. E.	

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## FENCING.

For Fencing, a number of Trophies have been presented by the Club, and great interest is taken in the annual competitions for championships.

Senior Champion - - W. C. Greig (Arts).

Junior " - - T. C. Overend (Arts).

The former was presented with a gold medal, the gift of John Falconbridge. The latter with a pair of foils, the gift of the club.

## Fencing Club of the University of Toronto.

## OFFICERS.

Hon. President.....John D. Falconbridge

President.....W. C. Greig.

Vice-President.....H. P. Rust.

Sec. and Treas.....C. R. Jamieson.

Curator.....A. W. Green.

Maitre d'Armes.....Serg. Williams

## THE TORONTO ENGINEER COMPANY,

Capt.....W. R. Lang, Professor of Chemistry University of Toronto.

Lt.....J. T. M. Burnside.

Lt.....A. C. Macdougall.

Company Sgt. Major ...H. W. Evans.

Sgt.....W. Elwell.

".....W. B. Porte.

Lance Sgt.....H. N. Gzowski.

" ".....H. D. Robertson.

Signal ".....W. E. Cane.

Quarter Master Sgt. ...A. Williams.

## SESSION 1901-1902.

### STUDENTS IN ATTENDANCE,

#### FIRST YEAR.

##### Regular Students.

3	Baldwin, G. W.	Aurora.
3	Barrett, J. H.	Port Hope.
3	Beatty, H. E.	Toronto.
2	Begg, W. A.	West Flamboro.
3	Blaine, T. R.	Barrie.
3	Boeckh, J. C.	Toronto.
3	Brown, T. D.	Barrie.
2	Bryce, R. A.	Toronto.
3	Burley, R. J.	Regina, Assa.
3	Burnham, F. W.	Ashburnham.
1	Cameron, N. C.	Peterboro.
2	Campbell, A. J.	Collingwood.
3	Campbell, A. M.	Trenton.
3	Cass, G. A.	L'Orignal.
2	Chase, A. V.	Orillia.
2	Chilver, C. A.	Walkerville.
2	Chilver, H. L.	Walkerville.
1	Christie, U. W.	Chesley.
2	Coates, P. C.	Victoria, B. C.
1	Code, S. B.	Smith's Falls.
1	Code, T. F.	Smith's Falls.
1	Cousins, E. L.	Toronto.
1	Cowan, W. A.	Galt.
3	Craig, S. E.	Snelgrove.
2	Crerar, S. R.	Brussels.
3	Currie, W. M.	Port Perry.

FIRST YEAR.—*Continued.*

1	Dunn, H. C.	Vancouver, B. C.
2	Elder, A. J.	Barrie.
2	Fee, T.	St. Catharines.
2	Fleck, J. G.	Ottawa.
2	Fletcher, H. M.	Hamilton.
1	Ford, A. L.	Toronto.
1	Foster, W. J.	Windsor.
3	Gibson, W. S.	Toronto.
3	Gray, W. W.	Uxbridge.
1	Hara, L. D.	Merriton.
3	Harris, C. J.	Brantford.
3	Henderson, T. D.	Acton.
1	Heron, J. B.	Scarboro Junct.
1	Hill, E. M.	Guelph.
2	Hill, S.	St. Thomas
1	Holmes, O. B.	Selkirk.
3	Howard, J. A.	Springvale.
2	Ingles, C. J.	Toronto.
3	Jermyn, P. V.	Toronto.
3	Johnston, J. W.	Toronto.
3	Keefe, W. S. H.	Iroquois.
2	Laing, P. A.	Dundas.
3	Legate, W. B.	London.
3	Little, J. C.	Moffat.
2	Mackenzie, C. M.	Galt.
2	McEwen, D. F.	Hensall.
1	McEwen, G. G.	Moose Creek.
3	McGibbon, C. P., B. A.	Brampton.
3	McKay, C. D.	Maplewood.
1	McMillan, D.	Woodville.
3	Manchester, C. S.	Ottawa.
3	Manson, C. J.	St. Catharines.
3	Marquis, G. P.	Brantford.
3	Moore, E. E.	Peterboro.
1	Moorhouse, W. N.	Toronto.

FIRST YEAR.—*Continued.*

3	Morden, L. W.....	Hamilton.
3	Munro, C. G.....	Thamesville.
3	Munro, W. H.....	Peterboro.
3	Nelson, J. A.....	St. Catharines.
3	O'Sullivan, J. J.....	Toronto.
3	Pardoe, W. S.....	Toronto.
3	Paris, J.....	White Lake.
2	Parke, J. P.....	Oil City.
3	Peaker, W. J.....	Bramptom.
1	Phillips, E. P. A.....	Cedardale.
3	Pickering, A. E.....	Bramptom.
2	Ramsay, G. L.....	Dunnville.
2	Raymond, D. L. C.....	Windsor.
3	Reynolds, G. B.....	Toronto.
1	Reid, F. B.....	Bowmanville.
3	Riddell, M. R.....	Toronto.
1	Robinson, L.....	Brockville.
3	Rogers, W. R.....	Fordwich.
3	Roxburgh, G. S.....	Norwood.
3	Rutherford, F. N.....	South Monaghan.
3	Sauder, P. N.....	Galt.
2	Scott, G. S.....	Toronto.
1	Sheply, J. D.....	Leamington.
3	Slater, F. W.....	London.
3	Smart, R. S.....	Toronto.
1	Smith, D. A.....	Claude.
3	Smither, W. J.....	Toronto.
3	Stover, C. B.....	Chatham.
2	Street, P. B.....	Toronto.
2	Stroud, A.....	Hamilton.
1	Sykes, F. H.....	Toronto.
2	Tait, B. J.....	Peterboro.
2	Thomson, J. E.....	Toronto.
1	Townsend, D. T.....	Woodstock.
1	Trimble, A. V.....	Toronto.

FIRST YEAR.—*Continued.*

3	Tucker, B. B.....	Allanburg.
2	Wade, E.....	Welland.
1	Walker, E. W.....	Cayuga.
3	Watson, J. P.....	Acacia.
1	Weir, J. M.....	Toronto.
3	Wilkie, J. H.....	Toronto.
1	Wells, A. F.....	Sandwich.
3	Wilson, J. M.....	Toronto.
3	Wright, W. F.....	Toronto.
3	Yates, P. M.....	London.

## Non-Regular Students Taking Full Course.

2	Allen, C. W.....	Toronto.
3	Arens, H. W.....	Orillia.
3	Baldwin, F. W.....	Toronto.
1	Bangham, J. ....	Windsor.
3	Bowles, G. W.....	Orangeville.
3	Calder, J. W.....	Cranbrook.
2	Evans, H. W.....	Toronto.
2	Field, J. J.....	Toronto.
3	Ford, E. A.....	Belleville.
1	Goodall, J. N.....	Bellwood.
3	Greene, E. A.....	Orillia.
3	Greenwood, W. K.....	Greenwood.
3	Helmuth, H. I.....	Toronto.
2	Horwood, H. O. R.....	Toronto.
2	Irving, T. C.....	Toronto.
2	Jackson, E. R.....	Seaforth.
3	Jamieson, D. W.....	Ottawa.
2	Kuhry, P. M.....	Formosa.
3	Legge, A. H.....	Jefferson.
3	Mackenzie, K. B.....	Sarnia.
3	McCuaig, O. B.....	Toronto.
2	Maddison, W. W.....	Toronto.

FIRST YEAR.—*Continued.*

- 3 Mills, J. E. . . . . Guelph.  
 2 Merritt, R. N. . . . . Toronto.  
 1 O'Brien, D. E. . . . . Merrickville.  
 3 Pace, G. . . . . Orillia.  
 2 Pullen, E. F. . . . . Oakville.  
 1 Roddick, J. O. . . . . Brantford.  
 3 Rundle, L. P. . . . . Goderich.  
 3 Schell, F. S. . . . . Brantford.  
 3 Serson, H. V. . . . . Antrim.  
 1 Southworth, H. S. . . . . Toronto.  
 3 Tait, E. L. . . . . St. Thomas.  
 2 Thompson, H. P. . . . . Toronto.  
 3 Thomson, S. E. . . . . Blenheim.  
 3 Townsend, C. J. . . . . Toronto.  
 3 Vaughan, J. . . . . Toronto.  
 5 Wickett, W. E. . . . . Toronto.  
 1 Weddell, R. G. . . . . Trenton.  
 1 Wilson, W. H. . . . . Toronto.

## SECOND YEAR.

- 3 Acres, H. G. . . . . Paris.  
 3 Alexander, J. H., B. A. . . . . Bramptom.  
 1 Alison, J. G. R. . . . . Toronto.  
 3 Angus, H. H. . . . . London.  
 3 Beatty, J. A. . . . . Fergus.  
 3 Bonnell, M. B. . . . . Bobcaygeon.  
 3½ Bridgland, M. P., B. A. . . . . Fairbank.  
 2 Burd, J. H. . . . . Parry Sound.  
 1 Burgess, E. L. . . . . Burgessville.  
 2 Burwash, N. A. . . . . Toronto.  
 4 Challies, J. B. . . . . Winchester.  
 2 Corbett, J. T. . . . . Puce.  
 2 Coulson, C. L. . . . . Welland.  
 3 Davison, A. E. . . . . Prescott.



SECOND YEAR.—*Continued.*

- 3 Depew, H. H. . . . . Hamilton.  
 3 Fensom, C. J. . . . . Toronto.  
 2 Fuce, E. O. . . . . Toronto.  
 3 Gaby, F. A. . . . . Toronto.  
 1 Gardner, J. C. . . . . Niagara Falls.  
 1 Gillespie, P. . . . . Cobourg.  
 1 Gordon, J. P. . . . . Toronto.  
 2 Gordon, W. C., B. A. . . . . Staffordville.  
 1 Gourlay, W. A. . . . . Toronto.  
 3 Gray, A. . . . . Port Credit.  
 2 Gzowski, H. N. . . . . Toronto.  
 2 Hamilton, J. F. . . . . Dunedin.  
 2 Hanes, G. S. . . . . Windsor.  
 2 Harcourt, F. Y., B. A. . . . . Toronto.  
 1 Hayes, L. J. . . . . Toronto.  
 1 Henderson, F. D. . . . . Crathie.  
 2 Horton, J. A. . . . . Hurondale.  
 3 Jackson, J. G. . . . . London.  
 1 Jackson, J. H., O.L.S. . . . . Windsor.  
 1 James, E. A. . . . . Thornhill.  
 3 Johnston, C. K. . . . . Pepperlaw.  
 1 Johnston, H. . . . . Meaford.  
 1 Kernahan, M. G. . . . . Toronto.  
 3 Lang, A. G. . . . . Toronto.  
 3 Larkworthy, W. J. . . . . Mitchell.  
 1 Latornell, A. J. . . . . Meaford.  
 1 Mackay, J. J., O.L.S. . . . . Woodstock.  
 1 McAuslan, H. J. . . . . Heathcote.  
 3 McFarlane, J. A. . . . . Donegal.  
 1 McNaughton, A. L. . . . . Cornwall.  
 5 Marriott, F. G. . . . . Toronto.  
 3 Maus, C. A. . . . . Paris.  
 3 Miller, M. L. . . . . Aylmer.  
 3 Milne, W. J. . . . . Brown's Corners.

SECOND YEAR.—*Continued.*

3	Mitchell, P. H.....	Waterloo.
2	Montgomery, R. H.....	Brantford.
2	Morton, P. E.....	Belhaven.
3	Mullins, E. E.....	Toronto.
3	Nevitt, I. H.....	Toronto
1	Oliver, E. W.....	Toronto.
3	Oliver, J. P.....	Eberts.
3	Pace, J. D.....	Orillia.
3	Patten, B. B.....	St. George.
2	Philp, D. H.....	Petrolea.
3	Pinkney, D. H.....	Morrison.
2	Plunkett, T. H.....	Meaford.
1	Porte, W. B.....	Toronto.
3	Rigsby, J. P.....	Toronto.
1	Robertson, D. F.....	Almonte.
3	Ross, R. B.....	Toronto.
1	Seymour, H. L.....	Toronto.
3	Shipe, H. M.....	Toronto.
3	Small, H. S.....	Toronto.
1	Smith, J. H.....	New Hamburg.
3	Smith, H. G.....	St. Catharines.
1	Stewart, M. A.....	Toronto.
3	Trees, S. L.....	Toronto.
2	Umbach, J. E.....	Elmira.
1	Waldron, J.....	Pine Grove.
3	Wass, S. B.....	Granton.
3	Whelihan, J. A.....	St Marys.
3	White, H. F.....	London.
2	Williams, C. G.....	London.
1	Wilson, N. D.....	Toronto.
1	Worthington, W. R....	Toronto.
1	Young, C. R.....	Picton.
2	Young, W. H.....	Clifford.

## THIRD YEAR.

- 3 Barber, H. G. .... Milton.  
 1 Blair, W. J. .... Embro.  
 3 Brown, J. M. .... Fergus.  
 2 Campbell, W. G. .... Toronto.  
 2 Campbell, A. R. .... Collingwood.  
 2 Christie, W. .... Chesley.  
 2 Conlon, F. T. .... Thorold.  
 3 Connor, H. V. .... Sarginson.  
 2 Culbert, M. T. .... London.  
 2 Cumming, R. .... Scotsburn, N.S.  
 1 Douglas, W. E., B.A. .... Toronto.  
 3 Dunlop, R. J. .... Toronto.  
 2 Edwards, W. M. .... Iroquois.  
 3 Elwell, W. .... Toronto.  
 2 Empey, J. M. .... Thamesford.  
 2 Forbes, D. L. H. .... Toronto.  
 1 Gibson, A. E. .... Ingersoll.  
 3 Goodwin, A. C. .... Grimsby.  
 2 Henry, J. S. .... Toronto.  
 3 Henwood, C. .... Port Hope.  
 3 Johnston, D. M. .... Toronto.  
 2 Knight, R. H. .... Bruce Mines.  
 5 Langmuir, F. L. .... Toronto.  
 3 McBride, A. H. .... Toronto.  
 1 McLennan, A. L. .... Toronto.  
 3 Mackay, J. T. .... Toronto.  
 3 Mace, F. G. .... Toronto.  
 3 Madden, J. F. S. .... Toronto.  
 3 Marrs, C. H. .... Beamsville.  
 3 Mathison, P. .... Union.  
 3 Mennie, R. S. .... Toronto.  
 2 Moore, H. H. .... Deer Park.  
 1 Moore, F. A. .... Toronto.  
 1 Morley, R. W. .... Toronto.

THIRD YEAR.—*Continued.*

1	Nash, T. S . . . . .	Morrisburg.
1	Powell, G. G . . . . .	Toronto.
1	Ratz, W. F . . . . .	Elmira.
3	Robertson, H. D. . . . .	Walkerton.
3	Sinclair, D. . . . .	Cheltenham.
2	Steele, I. J . . . . .	Boxall
3	Sutherland, W. H. . . . .	Toronto.
3	Taylor, T . . . . .	Cheltenham.
2	Teasdale, C. M . . . . .	Concord.
3	Wanless, A. A. . . . .	Toronto.
3	Zahn, H. J . . . . .	Toronto.

## FOURTH YEAR.

Barrett, R. H. . . . .	Amherstburg.
Boswell, M. C . . . . .	Peterboro.
Brandon, E. T. J. . . . .	Toronto.
Cockburn, J. R . . . . .	Toronto.
Eason, D. E. . . . .	Keene.
Harvey, C. . . . .	Indian Head, Assa.
Johnston, J. A . . . . .	Pefferlaw.
McMaster, A. T. . . . .	Toronto.
McVean, H. G. . . . .	Dresden.
Middleton, H. T. . . . .	Toronto.
Price, H. W. . . . .	Toronto.
Rust, H. P. . . . .	Toronto.
Sauer, M. V. . . . .	Toronto.
Smallpeice, F. C. . . . .	Toronto.
Stephenson, W. H . . . . .	Ancaster.
Wright, R. T. . . . .	Owen Sound.

## Occasional Students.

McMichael, C. M . . . . .	Toronto.
Montezambert, L. C. . . . .	St. Mary's.

## PRIZEMEN.

## Engineering.

1879.—	I.	Year.....	J. McAREE ..	1st prize.
1880.—	II.	"	J. L. MORRIS ..	1st "
1881.—	I.	"	G. H. DUGGAN ..	1st "
	II.	"	D. JEFFREY .	1st "
1882.—	I.	"	A. R. RAYMER.....	1st "
	I.	"	E. W. STERN.....	2nd "
	II.	"	G. H. DUGGAN.....	1st "
	III.	"	D. JEFFREY ..	1st "
1883.—	I.	"	B. A. LUDGATE ..	1st "
	I.	"	A. M. BOWMAN.....	2nd "
	II.	"	A. R. RAYMER.....	1st "
	II.	"	E. W. STERN ..	2nd "
	III.	"	G. H. DUGGAN ..	1st "
1884.—	II.	"	B. A. LUDGATE.....	1st "
	III.	"	E. W. STERN.....	1st "
	III.	"	A. R. RAYMER.....	2nd "
1885.—	I.	"	A. E. LOTT ..	1st "
	I.	"	J. ROGER.....	2nd "
	II.	"	T. K. THOMSON ..	1st "
	III.	"	B. A. LUDGATE.....	1st "
1886.—	I.	"	C. H. C. WRIGHT.....	1st "
	I.	"	J. E. ROSS ...	2nd "
	II.	"	A. F. LOTT ..	1st "
1887.—	I.	"	H. E. T. HAULTAIN.....	1st "
	II.	"	C. H. C. WRIGHT ..	1st "
	III.	"	A. E. LOTT ..	1st "
	III.	"	J. ROGER ..	2nd "
1888.—	I.	Year.....	E. B. MERRILL ..	1st "
	I.	"	F. M. BOWMAN ..	2nd "
	II.	"	D. D. JAMES ..	1st "
	III.	"	C. H. C. WRIGHT.....	1st "

PRIZEMEN. — *Continued.*

1889. —	I.	Year	.....	J. K. ROBINSON	.....	1st	prize.
	I.	"	.....	G. E. SILVESTER	.....	2nd	"
	II.	"	.....	E. B. MERRILL	.....	1st	"
	II.	"	.....	F. M. BOWMAN	.....	2nd	"
	III.	"	.....	D. D. JAMES	.....	1st	"
1890. —	I.	"	.....	C. FAIRCHILD	.....	1st	"
	II.	"	.....	J. K. ROBINSON	.....	1st	"
	III.	"	.....	F. M. BOWMAN	.....	1st	"
	III.	"	.....	E. B. MERRILL	.....	2nd	"
1891. —	I.	"	.....	A. J. MCPHERSON	.....	1st	"
	I.	"	.....	R. B. WATSON	.....	2nd	"
	II.	"	.....	J. B. GOODWIN	.....	1st	"
	III.	"	.....	G. E. SILVESTER	.....	1st	"
	III.	"	.....	C. W. DILL	.....	2nd	"
1892. —	I.	"	.....	A. E. BERGEY	.....	1st	"
	I.	"	.....	R. W. ANGUS	.....	2nd	"
	II.	"	.....	A. J. MCPHERSON	.....	1st	"
	II.	"	.....	R. B. WATSON	.....	2nd	"
	III.	"	.....	E. J. LASCHINGER	.....	1st	"
	III.	"	.....	C. FAIRCHILD	.....	2nd	"

The grant for prizes was withdrawn at the close of 1892.

**Architecture.**

The prize in Architecture is the gift of Mr. D. B. Dick, Architect, Toronto.

1891. —	I.	Year	.....	H. BALLANTYNE.
1892. —	I.	"	.....	J. A. EWART.
1893. —	I.	"	.....	A. H. HARKNESS.
1894. —	I.	"	.....	E. A. FORWARD.
1895. —	I.	"	.....	W. F. SCOTT.
1896. —	I.	"	.....	D. MACKINTOSH.
1899. —	I.	"	.....	W. F. SHEPHERD.



**Civil Engineering.**

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C.E., New York.

- 1897.—III. Year . . . . . M. B. WEEKES.  
 1898.—III. “ . . . . . J. A. STEWART.  
 1899.—III. “ . . . . . T. SHANKS.  
 1900.—III. “ . . . . . E. H. PHILLIPS.  
 1901.—III. “ . . . . . H. P. RUST.

**Mechanical and Electrical Engineering.**

Donor, Mr. F. A. Riehle, Philadelphia.

- 1897.—III. Year . . . A. T. GRAY.  
 1898.—III. “ . . . . . F. C. SMALLPEICE.

**UNIVERSITY OF TORONTO.****Degree of Bachelor of Applied Science (B.A.Sc.)**

Date of admission.	Name.	Date of admission.	Name.
1893..	Alison, T. H.	1894.*	Chewett, H. J.
1897.*	Angus, R. W.	1900.*	Chubbuck, L. B.
1901..	Ardagh, E. G. R.	1900..	Coulthard, R. W.
1896	Armstrong, J.	1901..	Craig, J. A.
1897.*	Bain, J. W.	1901..	Davison, J. E.
1894.*	Ballantyne, H. F.	1901..	Dickson, G. W.
1901..	Barley, J. H.	1901	*Dixon, A. H.
1895..	Beauregard, A. T.	1896..	Dobie, J. S.
1899..	Boyd, W. H.	1897.*	Elliott, H. P.
1896	Brodie, W. M.	1895.*	Ewart, J. A.
1895..	Bucke, W. A.	1901..	Foreman, W. E.
1900..	Burnside, J. T. M.	1894.*	Goodwin, J. B.
1898..	Carpenter, H. S.	1899	Grant, W. F.
1899	Carter, W. E. H.	1898	Gray, A. T.
1898..	Charlton, H. W.	1901..	Guy, E.

DEGREE OF BACHELOR OF APPLIED SCIENCE. — *Continued.*

1897.*Haight, H. V.	1894 *Merrill, E. B.
1900..Hare, W. A.	1893..Milne, C. G.
1897.*Harkness, A. H.	1896..Mines, W. H.
1901..Hemphill, W.	1895.*Minty, W.
1895..Herald, W. J.	1894..Mitchell, C. H.
1901..Holcroft, H. S.	1900..Monds, W.
1896..Hull, H. S.	1901..Neelands, E. V.
1894..James, D. D.	1901..Pope, A. S. H.
1893..James, O. S.	1900.*Revell, G. E.
1895.*Job, H. E.	1900..Richards, E.
1895..Johnson, S. M.	1901..Roaf, J. R.
1896..Johnson, A. C.	1898.*Robinson, A. H. A.
1894.*Keele, J.	1901..Saunders, H. W.
1899..Korman, J. S.	1900 *Shanks, T.
1894..Laidlaw, J. T.	1895..Shields, J. D.
1893..Laing, A. T.	1899..Shipley, A. E.
1893.*Laschinger, E. J.	1894.*Speller, F. N.
1901..Latham, R.	1898..Smiley, R. W.
1893.*Lawson, W.	1894..Squire, R. H.
1893..Lea, W. A.	1898.*Stull, W. W.
1894..McAllister, A. L.	1900.*Tennant, D. C.
1895..McAllister, J. E.	1901..Tennant, W. C.
1893..McAree, J.	1893..Thomson, R. W.
1897..Macallum, A. F.	1901..Thorne, S. M.
1893..McEntee, B.	1901..Thorold, F. W.
1896.*McGowan, J.	1896..Tremaine, R. C. C.
1896.*McKinnon, H. L.	1900..Wagner, W. E.
1901..McMillan, J. G.	1898..Weekes, M. B.
1894.*McPherson, A. J.	1901..Weir, H. M.
1895..McTaggart, A. L.	1899.*Williamson, D. A.
1897..Macbeth, C. W.	1893.*Wright, C. H. C.
1897..Martin, T.	

**Degree of Civil Engineer (C.E.).**

Date of admission.	Name.	Date of admission.	Name.
1898..	Alison, T. H.	1886..	Kennedy, J. H.
1898..	Ashbridge, W. T.	1895..	McAllister, J. E.
1895..	Bowman, A. M.	1901..	McDowall, R.
1893..	Bowman, F. M.	1898..	Mitchell, C. H.
1892	Chewett, H. J.	1896..	Moore, J. E. A.
1900..	Connor, A. W.	1885..	Morris J. L.
1901..	Francis, W. J.	1892..	Thomson, T. K.
1900..	Haultain, H. E. T.	1894..	Tyrrell, H. G.
1893..	Innes, W. L.	1889..	Tyrrell, J. W.

**Degree of Mining Engineer (M.E.)**

Date of admission.	Name.
1877.....	Bucke, M. A.
1900 .....	Laidlaw, J. T.

**Degree of Mechanical Engineer (M.E.)**

Date of admission.	Name.
1900.....	White, A. V.
1901.....	Johnston, A. C.

**Degree of Electrical Engineer (E.E)**

Date of admission.	Name.
1896.....	Ross, R. A.

---

## GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
<b>1881</b>		
1.	J. L. MORRIS, C.E., O.L.S.	Engineer and Surveyor.
	Pembroke, Ont.	
<b>1882</b>		
1.	D. JEFFREY.....	Contractor.
	Delmar, Iowa.	
1.	J. H. KENNEDY, C.E., O.L.S.	Chief Engineer Vancouver, Victoria & Eastern Ry.
	Vancouver, B.C.	
1.	J. McAREE, B.A.Sc., D.T.S.	Chief Engineer Pritchard Harbour Rat Portage, Ont. Copper Mining & Development Co.
<b>1883</b>		
1.	D. BURNS, O.L.S. ....	With American Bridge Co., Key- stone Branch.
	A.M. Can. Soc. C.E., Pittsburgh, Pa.	
1.	G. H. DUGGAN, M. Can. Soc. C.E.	Chief Engineer, Dominion Bridge Montreal, Que. Co.
1.	J. W. TYRRELL, C.E., D.L.S.	Surveying Staff Dept. of Interior. Ottawa, Ont.
<b>1884</b>		
1.	W. C. KIRKLAND .....	Chief Engineer Drainage Commis- sion of New Orleans.
	New Orleans, La.	
1.	J. McDOUGALL, B.A. ....	York County Engineer.
	A.M. Inst. C.E., Court House, Toronto, Ont.	
1.	A. R. RAYMER .....	Asst. Chief Engineer, P. & L. E. Pittsburgh, Pa. Ry.
1.	JAMES ROBERTSON, O.L.S. ....	Engineer and Surveyor.
	Glencoe, Ont.	
1.	E. W. STERN .....	Consulting Engineer, Steel Struc- tures, Buildings, etc.
	M. Am. Soc. C.E. 1133 Broadway, New York.	
<b>1885</b>		
1.	F. W. BLEAKELY .....	Civil Engineer.
	Sullivan Block, Seattle, W.T.	
1.	H. J. BOWMAN, D. & O.L.S.	Consulting Engineer.
	M. Can. Soc. C.E., Berlin, Ont.	(County Clerk and Treasurer.)
1.	E. E. HENDERSON, O.L.S. ....	Civil Engineer.
	Henderson P.O., Me.	

## GRADUATES.

## 1885—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	B. A. LUDGATE, O.L.S. . . . .	Engineering staff P. & L. E. Ry. Pittsburgh, Pa.
1.	O. McKAY, O.L.S. . . . .	Chief Engineer, Lake Erie and De- troit River Ry. Walkerville, Ont.

## 1886

- |    |                               |  |
|----|-------------------------------|--|
| 1. | A. M. BOWMAN, D.L.S. . . . .  | Engineer, Evansville Contract Co.<br>Pittsburgh, Pa.   |
| 1. | E. B. HERMON, D. & O.L.S. . . | Garden, Hermon & Burwell,<br>Vancouver, B.C.                      Engineers and Surveyors.                 |
| 1. | ROBERT LAIRD, O.L.S. . . . .  | Consulting and Mining Engineer.<br>Rat Portage, Ont.   |
| 1. | T. KENNARD THOMSON, C.E. . .  | Consulting Engineer.<br>M. Am. Soc. C.E.,<br>13-21 Park Row, New York.                                     |
| 1. | H. G. TYRRELL, C.E. . . . .   | Contracting Engineer, L. Schriber<br>A.M. Can. Soc. C.E.,                      & Sons Co.<br>Boston, Mass. |

## 1887

- |    |                                 |   |
|----|---------------------------------|---|
| 1. | J. C. BURNS (deceased).         |   |
| 1. | A. E. LOTT . . . . .            | Consulting Railway Engineer.<br>Mexico, Mexico.                                   |
| 1. | A. L. McCULLOCH, O.L.S. . . .   | City Engineer.<br>A.M. Can. Soc. C.E.,<br>Nelson, B.C.                            |
| 1. | F. MARTIN, M.B., O.L.S. . . . . | Physician.  |
| 1. | C. H. PINHEY, D. & O.L.S. . . . | Engineer for contractor, Soulanges<br>Coteau Landing.                      Canal. |
| 1. | J. ROGERS, O.L.S. . . . .       | Town Engineer.<br>Mitchell, Ont.  |

## 1888

- |    |                             |   |
|----|-----------------------------|---|
| 1. | J. F. APSEY, O.L.S. . . . . | With James River Construction<br>115 East Franklin st.,                      Co.<br>Richmond, Va. |
| 1. | W. T. ASHBRIDGE . . . . .   | Town Engineer, Lindsay, Ont.<br>Temple Building, Toronto,<br>Ont.                                 |
| 1. | EDWARD F. BALL . . . . .    | Civil Engineer.<br>A. M. Can. Soc. C. E., Room<br>400, Grand Central Station,<br>New York. N. Y.  |

## GRADUATES.

1888—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	D. B. BROWN, O.L.S. ....	Civil Engineer. Cuidad de Guatemala, Guatemala.
1.	C. M. CANNIFF .....	Engineer, Expanded Metal and Toronto. Fireproofing Co.
1.	H. J. CHEWITT, C.E., B.A.Sc..	Mining Engineer. A. M. Can Soc. C. E. 83½ York St., Toronto, Ont.
1.	J. GIBBONS, D. & O.L.S. ....	Surveying Staff, Dept. of Interior. Ottawa, Ont.
1.	R. McDOWALL, O.L.S., C.E. ..	Town Engineer. A. M. Can. Soc. C.E. Owen Sound, Ont.
1.	G. W. MCFARLEN, O.L.S. ....	City Engineer's Staff. Toronto, Ont.
1.	C. J. MARANI .....	Manager, Canada Permanent and P. O. Box 245, Western Canada Mortgage Cor- Vancouver, B.C. poration.
1.	G. R. MICKLE, B.A. ....	Lecturer in Mining Engineering Toronto, Ont. School of Practical Science.
1.	J. H. MOORE, O.L.S. ....	Town Engineer. Smith's Falls, Ont.
1.	G. H. RICHARDSON .....	Assist. City Engineer. Ottawa, Ont.
1.	K. ROSE.....	Civil and Mining Engineer. 62 William St., New York.
1.	J. E. ROSS, D. & O.L.S. ....	Surveying Staff, Dept. of Interior. Kamloops, B.C.
1.	C. H. C. WRIGHT, B.A.Sc. ....	Professor of Architecture, School Toronto, Ont. of Practical Science.
1889		
1.	B. CAREY.	Toronto, Ont.
1.	W. J. CHALMERS .....	Draftsman, Riter & Conley Mfg. Pittsburgh, Pa. Co.
1.	W. A. CLEMENT .....	Sewer Engineer, Staff of City A. M. Can. Soc. C.E., Engineer. Toronto, Ont.
1.	G. F. HANNING .....	Engineering Staff, Ont. & Rainy Port Arthur, Ont. River Ry.



## GRADUATES.

1889—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	H. E. T. HAULTAIN, C.E. ....	Mining Engineer.
	M. Can. Soc. C.E.	
	Nelson, B.C.	
1.	J. IRVINE .....	Civil Engineer.
	Harriston, Ont.	
1.	D. D. JAMES, B.A. ....	Engineering Staff, Algoma Com-
	B. A. Sc., O.L.S.,	mmercial Co.
	Sault Ste. Marie, Ont.	
1.	F. X. MILL (deceased).	
1.	H. K. MOBERLY .....	With Quebec Fire Assurance Co.
	Innisfail, Alberta.	
1.	T. R. ROSEBRUGH, M.A. ....	Professor in Electrical Engineering
	Toronto, Ont.	School of Practical Science.
1.	T. WICKETT, M.D. ....	Physician.
	Watford, Ont.	

## 1890

5. W. E. BOUSTEAD (deceased).
1. F. M. BOWMAN, O.L.S., C.E. . . . Structural Engineer, Riter & Con-  
Pittsburgh. Pa. . . . . ley Mfg. Co.
1. M. A. BUCKE, M.E. (deceased).
1. G. D. CORRIGAN (deceased).
1. J. A. DUFF, B.A. . . . . Lecturer in Applied Mechanics,  
A. M. Can. Soc. C.E., . . . . School of Practical Science.  
Toronto, Ont.
1. A. B. ENGLISH (deceased),
1. N. L. GARLAND . . . . . Garland Manufacturing Co.  
76 Bay St., Toronto, Ont.
1. J. HUTCHEON, O.L.S. . . . . City Engineer.  
Guelph, Ont.
1. W. L. INNIS, O.L.S., C.E. . . . Manager, Simcoe Canning Co.  
Simcoe, Ont.
1. E. B. MERRIL, B.A., B.A.Sc. . . Office of Westinghouse Electric &  
Pittsburgh, Pa. . . . . Mfg. Co.
1. J. R. PEDDER (deceased).
3. R. A. ROSS, E.E. . . . . Consulting, Electrical and Mechan-  
17 St. John St., . . . . ical Engineer.  
Montreal, P.Q.
1. T. H. WIGGINS, O.L.S. . . . . Drainage Engineer.  
Finch, Ont.
1. W. J. WITTHROW . . . . . With Luxfer Prism Co.  
Toronto, Ont.

## GRADUATES.

1891

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	H. J. BEATTY, O.L.S. ....	Surveyor. Eganville, Ont.
1.	T. R. DEACON, O.L.S. ....	Managing Director, Mikado Gold Rat Portage, Ont. Mining Co.
1.	C. W. DILL.....	Roadways Engineer, Staff of City Toronto, Ont. Engineer.
5.	O. S. JAMES, B.A. Sc. ....	Analytical Chemist and Assayer, Toronto, Ont. 227 George St.
1.	A. LANE .....	Civil Engineer. Barstow, Texas.
1.	J. E. McALLISTER, B. A. Sc. .	With Hamilton Bridge Works. Hamilton Ont.
3.	E. B. MERRILL, B.A., B.A.Sc.	Office of Westinghouse Electric & Pittsburgh, Pa. Mfg. Co.
1.	J. E. A. MOORE, C.E. ....	Estimating Engineer, Willman Cleveland, O. Seaver Engineering Co.
1.	W. NEWMAN, O. L. S. ....	City Engineer. A. M. Can. Soc. C.E. Windsor, Ont.
1.	J. K. ROBINSON (deceased).	
1.	W. B. RUSSEL .....	Chief Engineer, Temiscamangue Pembroke, Ont. Ry.
1.	G. E. SILVESTER, O.L.S. ....	DeMorest & Silvester, Civil and Sudbury, Ont. Mining Engineers.
1.	H. D. SYMMES .....	Manager, Sturgeon Lake Mining Niagara Falls, Ont. Co.

1892

1.	J. R. ALLAN, O.L.S. ....	Ranchman. Macleod, Alta.
1.	T. H. ALISON, B.A.Sc., C.E. .	Chief Engineer, Augustes, Smith 39-41 Cortland St., New York. York.
1.	A. G. ANDERSON,	Port Dover, Ont.
1.	C. FAIRCHILD, D. & O.L.S....	Surveying Staff, Dept. of Interior. Ottawa, Ont.
1.	J. B. GOODWIN, B.A.Sc. ....	Asst. Engineer Niagara Falls Niagara Falls, N.Y. Power Co.
4.	C. E. LANGLEY .....	Langley & Langley, Architects. Can. Life Bldg., Toronto, Ont.

## GRADUATES.

1892—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	A. T. LAING, B.A.Sc. .... Toronto, Ont.	Demonstrator in Surveying, School of Practical Science.
1.	E. J. LASCHINGER, B.A.Sc. .... Johannesburg, Transvaal, S. A.	Asst. Engineer General Water System Consolidated Gold Fields of South Africa.
5.	W. LAWSON, B.A.Sc. .... Alvarado, Cal.	Chief Chemist and Asst. Manager Alameda Sugar Co.
3.	W. A. LEA, B.A.Sc. .... Mexico, Mexico.	Mechanical Engineer Mexico St. Ry.
1.	B. McENTEE, B.A.Sc., 28 Queen St. E., Toronto, Ont.	
3.	C. G. MILNE, B.A.Sc. .... Hamilton, Ont.	Chief Draftsman, Hamilton Bridge Works.
1.	CHAS. H. MITCHELL, B.A.Sc. . C.E., A.M. Can. Soc. C.E., Niagara Falls, Ont.	Hydraulic Engineer.
1.	N. L. PLAYFAIR..... Midland, Ont.	Superintendent Playfair Lumber Co.
1.	J. M. PRENTICE (deceased).	
1.	J. A. ROSS ... .. Cleveland, O.	Chief Draftsman L. S. & M. S. Ry.
1.	ALBERT N. SMITH ..... 330 Main St. Pittsburg Pa.,	Superintending representative of Julian Kennedy, Consulting Engineer.
1.	R. W. THOMSON, B.A.Sc. . . . Johannesburg, Transvaal, S. A	Consulting Mining Engineer.
3.	A. V. WHITE, M.E. .... 24-30 Great Eastern St., London, E. C.	Managing Director the Spoke and Specialty Mfg. Co.

## 1893

- |    |                              |  |
|----|------------------------------|--|
| 1. | J. A. ARDAGH .....           | Staff of Division Engineer, C.P.R.<br>Toronto, Ont.                      |
| 4. | *H. F. BALLANTYNE, B.A.Sc. . | Treasurer, D. Appleton & Co.<br>72 Fifth Ave., New York.                 |
| 1. | G. L. BROWN, O.L.S. ....     | County Engineer, Dundas, Stor-<br>Morrishburgh, Ont. mont and Glengarry. |

\* Diploma with honors.

## GRADUATES.

1893—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	*L. C. CHARLESWORTH . . . . .	Government Agent of Mining Rat Portage, Ont.                      Lands.
1.	T. H. DUNN . . . . .	Firm of Dunn & Fullerton, Civil Winchester, Ont.                      Engineers.
1.	J. M. R. FAIRBAIRN, O.L.S. . . . .	Assistant Engineer, Trent Valley Beaverton, Ont.                      Canal.
4.	*W. FINGLAND . . . . .	Architect. 39 Caryl Ave, Yonkers, N.Y.
1.	C. FORESTER, Toronto, Ont.	
1.	W. J. FRANCIS, C.E. . . . .	Division Engineer Trent Canal. A.M. Can. Soc. C.E., Peterboro, Ont.
3.	*A. R. GOLDIE . . . . .	Manager, Goldie & McCulloch En- gine Works. Galt, Ont.
3.	S. C. HANLY . . . . .	Mechanical Engineer. Midland, Ont.
4.	*J. KEELE, B.A.Sc. . . . .	Geological Survey. Ottawa, Ont.
1.	J. T. LAIDLAW, B.A.Sc., M.E. . . . .	Consulting Mining Engineer. Fort Steele, B.C.
3.	F. L. LASH . . . . .	Manager, Batavia Electric Light Batavia, Java.                      Co.
1.	A. L. McALLISTER, B.A.Sc. . . . .	With New Jersey Steel and Iron Trenton, N.J.                      Co.
1.	T. J. McFARLEN . . . . .	Chief Chemist, Nova Scotia Steel Ferrona, N.S.                      Co.
1.	*A. J. McPHERSON, B.A.Sc. . . . .	Mining Engineer & Surveyor. D.L.S., Dawson, Yukon Ter.
1.	A. F. MACALLUM, B.A.Sc. . . . .	Lecturer, Toronto Technical Toronto, Ont.                      School.
1.	W. T. MAIN . . . . .	Civil Engineer. Brampton, Ont.
1.	V. G. MARANI . . . . .	Assistant Engineer Cleveland Gas, Cleveland, Ohio.                      Light and Coke Co.
1.	W. MINES, B.A.Sc. . . . .	With Brown Hoisting Company. Cleveland, Ohio.

\*Diploma with honors.

## GRADUATES.

1893—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	*J. M. ROBERTSON .....	Engineer, Chambly Electric Works Chambly, P.Q.
1.	R. RUSSEL .....	Resident Engineer, Bruce Mines & Bruce Mines, Ont. Algoma Ry.
1.	*F. N. SPELLER, B.A.Sc. ....	Chemist, National Tube Dpt. U.S. McKeesport, Pa. Steel Corporation.
1.	R. H. SQUIRE, B.A.Sc., O.L.S.	Engineer and Surveyor. Brant Chambers, Brantford, Ont.
1.	W. V. TAYLOR .....	Engineering Staff C.P.R. Winnipeg, Man.
1.	*R. B. WATSON .....	Mining Engineer. Dawson, Yukon Ter.

## 1894

3.	*R. W. ANGUS, B.A.Sc. . . . .	Lecturer in Mechanical Engineer- Toronto, Ont. ing, School of Practical Science.
1.	H. F. BARKER .....	With Office Specialty Mfg. Co. Toronto.
1.	A. T. BEAUREGARD, B.A.Sc. . .	With United Gas Improvement Philadelphia, Pa. Co.
1.	A. E. BERGEY . . . . .	With American Bridge Co., Key- Pittsburgh, Pa. stone Branch.
3.	D. G. BOYD .....	Inspector of Mines. Michipicoten, Ont.
3.	W. A. BUCKE .....	With Canadian General Electric Toronto, Ont. Co.
1.	J. CHALMERS, O.L.S. ....	Asst. Engineer, Canadian North- A.M. Can. Soc. C.E., ern Ry. Winnipeg, Man.
4.	*J. A. EWART, B.A.Sc. ....	Arnoldi & Ewart, Architects. - Ottawa, Ont.
3.	W. J. HERALD, B.A.Sc. ....	With Dominion Iron and Steel Co. Sydney, N.S.
3.	H. E. JOB, B.A.Sc. ....	Manager, Toronto & Hamilton Hamilton, Ont. Electric Co.
3.	A. C. JOHNSTON, B.A.Sc., M.E.	Consulting Mechanical Engineer. Bristol, Pa.
1.	S. M. JOHNSTON, B.A.Sc., P.L.S.	City Engineer. Greenwood, B.C.

\* Diploma with honors.

## GRADUATES.

1894—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	J. E. JONES .....	With Carnegie Steel Co. Pittsburgh, Pa.
3.	N. M. LASH .....	Asst. Electrical Engineer, Bell Montreal, P.Q. Telephone Co.
1.	*A. L. McTAGGART, B.A.Sc. ...	With the Lackawana Iron and Scranton, Pa. Steel Co.
3.	*W. MINTY, B.A.Sc. ....	Consulting Engineering Dept., Na- Manchester, Eng. tional Boiler & General Insur- ance Co.
3.	C. J. NICHOLSON, Preston, Ont.	
1.	H. ROLPH .....	Mining Engineer. Dawson City, Yukon Ter.
1.	J. D. SHIELDS, B.A.Sc. ....	Staff of City Engineer. Toronto, Ont.
3.	A. K. SPOTTON .....	Chief Engineer, John Inglis & Toronto, Ont. Sons.
1.	ANGUS SMITH, O.L.S. ....	City Engineer. Stratford, Ont.
3.	R. T. WRIGHT .....	Post Graduate Course, School of Toronto, Ont. Practical Science.

## 1895

1.	J. ARMSTRONG, B.A.Sc. ....	Engineering Staff, Can. Northern Edmonton, N.W.T. Ry. Co.
3.	A. E. BLACKWOOD ...	Manager, New York Office, Sulli- 71 Broadway, New York. van Machinery Co.
1.	E. J. BOSWELL, O.L.S. ....	Asst. Engineer C. P. R. Trail, B.C.
3.	G. BREBNER .....	With General Electric Co. Schenectady, N.Y.
3.	W. M. BRODIE, B.A.Sc. ....	Manager Pendrith & Co. Toronto, Ont.
3.	L. L. BROWN .....	With Engineering Contract Co., 3 Plaza St., Brooklyn, N.Y. 71 Broadway, New York.
4.	R. J. CAMPBELL .....	Artist, Chicago Tribune. Chicago, Ill.
3.	A. W. CONNOR, B.A., C.E. ...	With Hamilton Bridge Works. Hamilton, Ont.
1.	J. S. DOBIE, B.A.Sc. ....	Mining Engineer. Bruce Mines, Ont.

\*Diploma with honors.



## GRADUATES.

1895—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	F. W. GUERNSEY . . . . .	Engineer, White Bear Mining Co. Rossland, B.C.
4.	A. H. HARKNESS, B.A.Sc. . . . .	Fellow in Civil Engineering, Toronto, Ont.                      School of Practical Science.
3.	H. S. HULL, B.A.Sc. . . . .	With Frick Co. Ice and Refriger- Waynesboro, Pa.                      ating Machinery.
3.	*J. MCGOWAN, B.A., B.A. Sc.,	Lecturer, Toronto Technical Toronto, Ont.                      School.
3.	W. N. MCKAY . . . . .	With Bank of Hamilton. Hamilton, Ont.
3.	H. L. MCKINNON, B.A.Sc. . . . .	With the Snider Hughes Co. Cleveland, O.
1.	W. W. MEADOWS, O.L.S. . . . .	Engineer and Surveyor. St. Thomas, Ont.
1.	F. J. ROBINSON, D. & O.L.S. . . . .	District Engineer, Southern Macleod, Alta.                      Alberta.
3.	F. T. STOCKING . . . . .	With Pike's Peak Power Co. Victor, Col.
3.	R. C. C. TREMAINE, B.A.Sc. . . . .	Manager, Exeter Electric Light Exeter, Ont.                      and Power Co.

## 1896

- |    |                                 |   |
|----|---------------------------------|---|
| 2. | *J. W. BAIN, B.A.Sc. . . . .    | Demonstrator in Analytical Chem-<br>istry, School of Practical Science<br>Toronto, Ont.                             |
| 2. | L. T. BURWASH . . . . .         | Mining Recorder, Timber and<br>Stewart River P.O., Yukon. Crown Lands Agent.  |
| 3. | *G. M. CAMPBELL . . . . .       | Engineer of Works, P. & L. E.<br>Pittsburgh, Pa.                      Ry. Co.                                       |
| 2. | J. A. DECEW . . . . .           | Lecture Assistant, School of Prac-<br>tical Science<br>Toronto, Ont.  |
| 3. | *H. P. ELLIOTT, B.A.Sc. . . . . | With Westinghouse Electric and<br>Pittsburgh, Pa.                      Mfg. Co.                                     |
| 3. | W. C. GURNEY . . . . .          | Chief Engineer, Steam and Hot<br>Toronto, Ont.                      Water Heating Department,<br>Gurney Foundry Co. |
| 3. | *H. V. HAIGHT, B.A.Sc. . . . .  | Engineer, Canadian Rand Drill Co.<br>Sherbrooke, P.Q.   |
| 1. | W. F. LAING . . . . .           | Engineer on construction, Algoma<br>Sault Ste. Marie, Ont.                      Central Ry. Co.                     |

\*Diploma with honors.

## GRADUATES.

1896—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	R. R. LAWRIE (deceased).	
3.	C. MACBETH, B.A.Sc. ....	Engineering Staff, Michigan Central Railroad. Detroit, Mich.
3.	J. A. McMURCHY .....	With Westinghouse Machine Co. Pittsburgh, Pa.
1.	T. MARTIN, B.A.Sc. ....	Engineering Staff, Ontario Rainy River Ry. Port Arthur, Ont.
3.	R. R. SHIPE .....	With Toronto Engraving Co. Toronto, Ont.

## 1897

2.	E. ANDREWES, B.Sc. ....	Res. Engineer, Main Offeren Slate Blaenau, Festiniog, N. Wales Quarry Co.
2.	*J. A. BOW .....	Explorer, Lake Superior Power Sault Ste. Marie, Ont. Co.
1.	H. S. CARPENTER .....	Town Engineer. B.A.Sc., O.L.S., Collingwood, Ont.
5.	H. W. CHARLTON, B.A.Sc. ....	Assistant Analyst at Experimental Ottawa, Ont. Farm.
4.	*E. A. FORWARD .....	Asst. Engineer, Cornwall Canal. A.M. Can. Soc. C.E., Dickinson's Landing, Ont.
3.	*A. T. GRAY, B.A.Sc. ....	With General Electric Co. Schenectady, N.Y.
3.	W. A. B. HICKS .....	With Lackawanna Iron & Steel Co. Buffalo, N.Y.
4.	C. F. KING .....	Geological Survey. Ottawa, Ont.
1.	H. W. PROUDFOOT .....	With Jack Lake Mining Co. Matawin, Ont.
2.	*A. H. A. ROBINSON, B.A.Sc. .	Fellow in Mining Engineering, Toronto, Ont. School of Practical Science.
4.	W. F. SCOTT .....	Architect. Toronto, Ont.
3.	*R. W. SMILEY, B.A.Sc. ....	Draftsman, Garrett-Cromwell Cleveland, O. Engineering Co.
2.	*W. W. STULL, B.A.Sc., O.L.S..	With DeMorest & Silvester, Sudbury, Ont. Engineers and Surveyors.

\*Diploma with honors.

## GRADUATES.

1897—Continued.

COURSE.	NAME AND ADDRESS	OCCUPATION.
1.	*M. B. WEEKES, B.A.Sc. . . . . Ottawa, Ont.	Surveying Staff, Dept. of the Interior.
1	E. A. WELDON . . . . . Port Arthur, Ont.	Engineering Staff, Ont. and Rainy River Ry.

## 1898

1.	W. H. BOYD, B.A.Sc. . . . . Ottawa, Ont.	Geological Survey.
2.	W. E. H. CARTER, B.A.Sc. . . . . Toronto, Ont.	Secretary, Bureau of Mines.
3.	E. H. DARLING . . . . . Walkerville, Ont.	With Canadian Bridge Co.
1.	W. F. GRANT, B.A.Sc. . . . . Sault Ste. Marie.	Town Engineer.
1.	T. S. KORMANN, B.A.Sc. . . . . Toronto, Ont.	Asst. Resident Engineer G.T. Ry.
3.	J. E. LAVROCK . . . . . Niagara Falls, N.Y.	With Niagara Falls Power Co.
4.	D. MACKINTOSH . . . . . Ithaca, N.Y.	Post Graduate Course, Cornell University.
1.	F. W. McNAUGHTON, O.L.S. . . . . Cornwall, Ont.	Town Engineer.
1.	J. H. SHAW, O.L.S. . . . . North Bay, Ont.	Surveyor.
3.	A. E. SHIPLEY, B.A.Sc. . . . . 277 Broadway, New York, N.Y.	With United Coke & Gas Co.
3.	*F. C. SMALLPEICE . . . . . Toronto, Ont.	Post Graduate Course, School of Practical Science.
1.	R. W. SMITH, P.L.S. . . . . Rossland, B.C.	Surveyor.
1.	*J. A. STEWART, M.A. . . . . Pittsburgh, Pa.	With McClintick-Marshall Con- struction Co.
1.	*H. L. VERCORE . . . . . Swan River, Man.	Engineering Staff, Manitoba and Northern Ry.
3.	T. A. WILKINSON . . . . . New Kensington, Pa.	Asst. Electrical Engineer, Pitts- burgh Reduction Co.
3.	D. A. WILLIAMSON, B.A.Sc. . . . . Hamilton, Ont.	With Hamilton Bridge Co.

\*Diploma with honors.

## GRADUATES.

1899

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	T. BARBER .....	With Georgian Foundry, Meaford, Ont.
2.	J. T. M. BURNSIDE, B.A.Sc. ....	Fellow in Drawing, School of Toronto, Ont. Practical Science.
3.	L. B. CHUBBUCK, B.A.Sc. ....	With Westinghouse Electric and Pittsburgh, Pa. Mfg. Co.
2.	G. A. CLOTHIER .....	With St. Eugene Construction Moyie, B.C. and Milling Co., Limited.
1.	C. COOPER .....	Carlyle, Assa.
2.	R. W. COULTHARD, B.A.Sc. ..	Chief Chemist, Crow's Nest Pass Ferne, B.C. Coal Co.
3.	J. A. CRAIG, B.A.Sc. ....	Fellow in Mechanical Engineering, Toronto, Ont. School of Practical Science.
2.	J. C. ELLIOT .....	With Mother Lode Mine. Bella Bella, B.C.
3.	W. E. FORMAN, B.A.Sc. ....	With the Westinghouse Electric Pittsburgh, Pa. and Mfg. Co.
3.	E. GUY, B.A.Sc. ....	With the Westinghouse Electric Pittsburgh, Pa. and Mfg. Co.
3.	*W. A. HARE, B.A.Sc. ....	Engineer, Rhodes, Curry & Co., Amherst, N.S. Ltd.
1.	R. LATHAM, B.A.Sc. ....	Asst. Engineer, T. H. & B. Ry. Hamilton, Ont.
3.	W. MONDS, B.A.Sc. ....	Demonstrator in Mechanical En- Toronto, Ont. gineering, School of Practical Science.
1.	J. PATTERSON, B.A. ....	1851 Exhibition Science Scholar, Cambridge, Eng. University of Cambridge.
3.	A. S. H. POPE, B.A.Sc. ....	With Canadian General Electric Peterboro, Ont. Co.
2.	*G. E. REVELL, B.A.Sc. ....	With Canadian General Electric Peterboro, Ont. Co.
3.	*E. RICHARDS, B.A.Sc. ....	With Toronto Electric Light Co. Toronto, Ont.
3.	G. A. SUNDERS .....	With General Electric Co. Schenectady, N.Y.
1.	*T. SHANKS, B.A.Sc., D.L.S. .	Topographical Surveys Branch, Ottawa, Ont. Dept. of the Interior.

\* Diploma with honors.

## GRADUATES.

1899—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	*D. C. TENNANT, B.A.Sc. .... Montreal, P.Q.	With Dominion Bridge Co.
3.	W. W. VANEVRY ..... Lebanon, Pa.	With Lackawana Iron and Steel Co.
2.	G. H. WATT, D.L.S. .... Ottawa, Ont.	Topographical Surveys Branch, Dept. of Interior.
3.	W. E. WAGNER, B.A.Sc. .... Severn Bridge, Ont.	In charge of Construction of Elec- tric Light Plant for Orillia.
3.	E. YEATES ..... London, Ont.	With London Machine Tool Co.

## 1900

1.	J. L. ALLAN ..... Sydney, N.S.	City Engineer's Staff.
2.	E. G. R. ARDAGH, B.A.Sc. . . Toronto, Ont.	Fellow in Chemistry. School of Practical Science.
3.	J. A. BAIN ..... Pittsburgh, Pa.	Structural Dept. S. V. Huber & Co., Consulting Engineers.
3.	J. H. BARLEY, B.A.Sc. .... Schenectady, N. Y.	With General Electric Co.
2.	*M. C. BOSWELL ..... Toronto, Ont.	Post Graduate Course. School of Practical Science.
1.	L. T. BRAY, O.L.S. .... Amherstburgh, Ont.	Surveyor.
3.	J. CLARK ..... Michipicoten Harbor, Ont.	Mechanical Engineer, Grace Mine.
2.	J. E. DAVISON, B.A.Sc., Toronto, Ont.	
3.	E. D. DICKINSON ..... Schenectady, N. Y.	With General Electric Co.
3.	G. W. DICKSON, B.A.Sc. .... Michipicoten Harbor, Ont.	Assayer, Grace Mine.
2.	*H. A. DIXON, B.A.Sc. .... Smith's Falls, Ont.	Office of J. H. Moore, O L.S., Engineer and Surveyor.
2.	C. H. FULLERTON ..... Winchester, Ont.	Firm of Dunn & Fullerton, Civil Engineers.
3.	W. S. GUEST ..... Toronto.	Draftsman. C. H. Riches & Co.
3.	W. HEMPHILL, B.A.Sc. .... 40 Court St., Buffalo, N.Y.	With Cataract Power and Con- duit Co.
3.	S. E. M. HENDERSON ..... Schenectady, N. Y.	With General Electric Co.

\*Diploma with honors.

## GRADUATES.

1900—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	J. A. HENRY . . . . .	With General Electric Co. Schenectady, N. Y.
2.	H. S. HOLCROFT, B.A.Sc., O.L.S.	Office of Speight and VanNost- trand, Surveyors. Toronto, Ont.
3.	H. A. JOHNSTON . . . . .	With Polson Iron Works. Toronto, Ont.
3.	J. C. JOHNSTON . . . . .	City Engineer's Staff. Toronto, Ont.
2.	*J. A. JOHNSTON . . . . .	Post Graduate Course. School of Toronto, Ont. Practical Science.
2.	R. E. MCARTHUR, Toronto, Ont.	
2.	J. G. McMILLAN, B.A.Sc. . . . .	With the Gertrude Mine. Sudbury Ont.
3.	L. HAUN MILLER . . . . .	With Wellman-Sever Engineering Cleveland, O. Co.
2.	E. V. NEELANDS, B.A.Sc. . . . .	Asst. Manager, St. Eugene Mine. Moyie, B.C.
1.	*E. H. PHILLIPS, D.L.S. . . . .	Topographical Surveys Branch, Ottawa, Ont. Dept. of the Interior.
2.	J. R. ROAF, B.A.Sc. . . . .	Draftsman, Crows' Nest Pass Coal Ferne, B. C. Co.
3.	*C. H. E. ROUNTHWAITE . . . . .	Asst. Superintendent Canadian Sault Ste. Marie, Ont. Electro-Chemical Co., Limited.
2.	H. W. SAUNDERS, B.A.Sc. . . . .	Asst. Engineer in Coal Mines. Johnstown, Pa.
1.	A. TAYLOR . . . . .	With C. P. R. Land Department. Winnipeg, Man.
1.	W. C. TENNANT, B.A.Sc. . . . .	Asst. Engineer, Schomberg and Kettleby, Ont. Aurora Railway.
2.	S. M. THORNE, B.A.Sc. . . . .	With the Dominion Iron and Steel Sydney, N. S. Co.
1.	F. W. THOROLD, B.A.Sc. . . . .	Office of Willis Chipman, C.E. Toronto, Ont.
1.	H. M. WEIR, B.A.Sc. . . . .	With Cleveland Gas, Light and Cleveland, O. Coke Co.
3.	F. D. WITHROW . . . . .	Inspector of Materials for Illsley Toronto, Ont. & Horn, King Edward Hotel.
1901		
1.	R. H. BARRETT . . . . .	Post Graduate Course School of Toronto, Ont. Practical Science.
3.	W. G. BEATTY, Fergus, Ont.	

\* Diploma with honors.



## GRADUATES.

1901—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	G. M. BERTRAM ..... 71 Broadway, New York.	Office of Sullivan Machinery Co.
3.	W. J. BOWERS ..... Toronto, Ont.	Office of Willis Chipman, C.E.
3.	E. T. J. BRANDON ..... Toronto, Ont.	Post Graduate Course, School of Practical Science.
3.	W. P. BRERETON ..... Hamilton, Ont.	With Smart, Eby Co.
3.	J. T. BROUGHTON ..... Toronto, Ont.	With the Northey Company, Ltd.
3.	*W. G. CHACE ..... Toronto, Ont.	Fellow in Electrical Engineering, School of Practical Science.
3.	A. G. CHRISTIE ..... Pittsburgh, Pa.	With Westinghouse Machine Co.
3.	J. R. COCKBURN ..... Toronto, Ont.	Post Graduate Course, School of Practical Science.
1.	W. A. DUFF ..... Hamilton, Ont.	Asst. Engineer on Construction, G. T. R.
2.	*D. E. EASON ..... Toronto, Ont.	Post Graduate Course, School of Practical Science.
1.	*S. GAGNÉ ..... Grand Forks, B.C.	Engineering Staff, Victoria, Van- couver & Eastern Ry.
3.	N. R. GIBSON ..... Galt, Ont.	Works of Cowan & Co.
1.	C. HARVEY ..... Toronto, Ont.	Post Graduate Course, School of Practical Science.
2.	A. T. E. HAMER ..... Bruce Mines, Ont.	Assayer, Rock Lake Mining Co.
2.	F. C. JACKSON ..... Bruce Mines, Ont.	Res. Engineer, Bruce Mines & Algoma Ry.
3.	*A. LAIDLAW ..... Toronto, Ont.	Engineering Staff, National Port- land Cement Co.
3.	W. C. LUMBERS ..... Toronto, Ont.	Draftsman, C. P. R. Engineer's Office.
3.	A. C. MACDOUGALL ..... Toronto, Ont.	Draftsman, Canadian General Electric Co.
3.	A. T. C. MCMASTER ..... Toronto, Ont.	Post Graduate Course, School of Practical Science.

\* Diploma with honors.

## GRADUATES.

1901—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	G. MACMILLAN . . . . .	Engineering Staff, Algoma Central Sault Ste. Marie, Ont. Ry.
3.	*H. G. McVEAN . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
2.	W. C. MATHESON . . . . .	Assayer, Canadian Gold Fields Delora, Ont. Co.
3.	H. T. MIDDLETON . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
2.	J. L. R. PARSONS, B.A. . . . .	Geologist, Algoma Commercial Sault Ste. Marie, Ont. Co.
1.	G. H. POWER . . . . .	Office of Willis Chipman, C.E. Toronto, Ont.
3.	*H. W. PRICE . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
1.	*H. P. RUST . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
3.	M. V. SAUER . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
3.	W. H. STEVENSON . . . . .	Post Graduate Course, School of Toronto, Ont. Practical Science.
1.	R. D. WILLSON . . . . .	Engineering Staff, Can. Northern Winnipeg, Man. Ry.

## CERTIFICATES.

## METALLURGY AND ASSAYING.

DATE.	NAME AND ADDRESS.	OCCUPATION.
1896.	G. JOHNSTON . . . . .	
1896.	A. T. TYE . . . . .	
1897.	E. B. WEBSTER . . . . .	
1898.	A. N. McMILLAN . . . . .	
	Penetanguishene, Ont.	
1900.	A. H. SMITH . . . . .	Mining Engineer, Los Reyes Gold Oaxaca, Mexico. Mining & Milling Co.
1901.	G. A. HUNT . . . . .	

## ELECTRICITY

1896.	E. I. SIFTON . . . . .	Manager, London Electric Con- struction Co.
-------	------------------------	--

\*Diploma with honors.





CALENDAR

OF THE

Ontario  
School of Practical Science.

(Affiliated to the University of Toronto.)

Faculty of Applied Science and Engineering  
of the  
University of Toronto.



Twenty-Sixth Session, 1903-1904,  
TORONTO.

WARWICK BROS  
& RUTTER &



TORONTO



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## CALENDAR 1903—1904.

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1903.	Sept.	24	Meeting of Council.
		28	Supplemental Examinations begin.
		30	Registration of Students.
	Oct.	1	First term begins. Lectures and practical work begin. Last day for presentation of Vacation work.
		9	Meeting of Council.
		14	Meeting of Engineering Society.
		28	Meeting of Engineering Society.
	Nov.	11	Meeting of Engineering Society.
		13	Meeting of Council.
		25	Meeting of Engineering Society.
	Dec.	9	Meeting of Engineering Society.
		11	Meeting of Council.
		22	First term ends.
1904.	Jan.	5	Second term begins.
		8	Meeting of Council,
		13	Meeting of Engineering Society.
		27	Meeting of Engineering Society.
	Feb.	10	Meeting of Engineering Society.
		17	Ash Wednesday, building closed.
		24	Meeting of Engineering Society.
	March	9	Meeting of Engineering Society.
		11	Meeting of Council.
		23	Meeting of Engineering Society.
		25	Annual meeting of Engineering Society.
	Apr.	1	Good Friday, building closed.
		8	Meeting of Council.
		9	Lectures and practical work close.
		15	Annual examinations begin.
		20	Last day for presentation of thesis for B. A. Sc.
		21	Examinations for B. A. Sc. begin.
	May	6	Meeting of Board of Examiners.
		9	Meeting of Council.
	June	10	University Commencement.

Candidates for Annual and Supplemental Examinations are required to give three weeks' notice, in writing, of their intention to take the same.

The building will be closed on all public holidays and daily at 1 p. m. during July and August.

1903.

## SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

## OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

## DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

1904.

## JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

## FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	..	..	..	..	..
..	..	..	..	..	..	..

1904.

## MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

## APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

## JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..

## JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

## AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

TIME TABLE—FIRST YEAR.  
SESSION 1903-1904.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	*Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Trigonometry.	*Algebra.	*Euclid.	*Trigonometry.	9-10
10-11	*Electricity and Magn'm, 3, 5 (a) Electricity, 3, 5 (b) History of Arch'te, 4 Drawing, 1, 2	Drawing.	*Electricity and Magn'm, 3, 5 (a) Drawing, 1, 2, 4 do 3, 5 (b)	Drawing. *Heat, (a) (b)	*Elect'y & Magn'm, 3, 5 (a) Electricity, 3, 5 (b) Pen and Ink, 4 Drawing, 1, 2	10-11
11-12	Statics, 1, 2, 3, 4 do 5 (a) Chemical Lab'y, 5 (b)	Dynamics.	Drawing.	Dynamics.	Statics, 1, 2, 3, 4 do 5 (a)	11-12
12-1	Surveying, 1, 2, 3, 4 Chemical Lab'y 5	Chemistry.	Chemistry.	Chemistry.	Descriptive Geometry.	12-1



2-3	*Mineralogy, 1, 2, 4, 5 Drawing, 3 (a) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 3, 4 (b)	Chem'l Lab'y, 5 do, 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 3 do, 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do, 1, 2, 4 (b)	2-3
3-4	*Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3 (a) do, 1, 2, 5 (b) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2, 5 (b) Drawing, 1, 3, 4 (b)	Chem'l Lab'y, 5 do, 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 4 do, 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do, 1, 2, 4 (b)	3-4
4-5	*Mineralogical Lab'y, 1, 2, 5 (a) Drawing, 3 (a) do, 1, 2, 5 (b) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2, 5 (b) Drawing, 1, 3, 4 (b)	Chem'l Lab'y, 5 do, 1, 4 (b) Electrical Lab'y, 3, 5 Drawing, 2, 4 do, 1, 4 (a)	*Physical Lab'y, 3, 5 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5 Electrical Lab'y, 3, 5 Field Work, 1, 2, 4 (a) Drawing, do, 1, 2, 4 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drawing during the remainder of the Session.

TIME TABLE—SECOND YEAR.  
SESSION 1903-1904.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Descriptive Geom'y, 1, 2, 3, 4	Surveying (Lect.) Electricity, 1, 2, 4 3	*Calculus, 1, 2, 3, 4	*Astronomy, Lithology, Electricity, History of Arch'e, 1 2 (a) 3 4	*Calculus, 1, 2, 3, 4	9-10
10-11	Drawing. Organic Chemistry 5	Applied Chemistry.	Spherical Trig'y, 1, 2, 3 (a) Orders of Arch'e, 4	Applied Chemistry.	History of Ornament, Drawing, 1, 2, 3 4	10-11
11-12	Theory of Mechanism, Drawing, 1, 2, 4 3 *Inorganic Chem'y, 5	Chemical Lab'y.	*Hydrostatics, *Optics, (a) (b)	Geology, Drawing, 1, 2, 5 3	Theory of Mechanism, Drawing, 1, 2, 4 3 *Inorganic Chem'y, 5	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y.	Strength of Materials, 1, 2, 3, 4	Metallurgy.	Dynamics, Drawing, 1, 2, 3 4	12-1

2-3	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing,	1, 2, 4 (b) 5 1, 2, 4 (a) 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 3, 4 (b)	2-3
3-4	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing,	1, 2, 4 (b) 5 1, 2, 4 (a) 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 2, 4 (a) 1, 3, 4 (b)	3-4
4-5	Chemical Lab'y, Mineralogical Lab'y, Electrical Lab'y, Drawing, do	2 (a) 1, 2 (b) 3 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, Drawing,	1, 2, 4 (b) 5 1, 2, 4 (a) 3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2, 4 do 3 (b)	*Physical Lab'y, 1, 2, 4 (b) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (a) Drawing, 3	*Physical Lab'y, Chemical Lab'y, Field Work, Drawing, 1, 2, 4 (a) 1, 3, 4 (b)	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drawing during the remainder of the Session

## TIME TABLE—THIRD YEAR.

SESSION 1903-1904.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Thermodynamics, 1, 2, 3 History of Arch'te 4 *Biology, 5	Hydraulics, 1, 2, 3, 4	Thermodynamics, 1, 2, 3 Architectural Design, 4	Hydraulics, 1, 2, 3, 4	Mechanics of Machinery, Principles of Dec'n, 4 Drawing, 1, 2 *Biology, 5	9-10
11	Metallurgy, 2, 5 Drawing, 1, 3, 4	Theory of Construction, 1, 4 do 2, 3 (a) Chemical Lab'y, 2 (b) Mechanics of Machinery, 3 (b)	Compound Stress, 1, 3, 4 Drawing, 2 (a) Assaying, 2 (b)	Theory of Construction, 1, 4 do 2, 3 (a) Chemical Lab'y, 2 (b)	Electricity, 1, 2, 4, 5 do 3 (b)	10-11
1-12	Ore Deposits, 2 Drawing, 1, 3, 4	Astronomy and Geodesy, 1 Electricity, 3 Chemical Lab'y, 2 (b) Drawing, 4	Assaying, 2 (b) Drawing, 1, 3, 4	Astronomy, 1 Electricity, 3 Chemical Lab'y, 2 (b) Drawing, 4	Mining and Ore Dressing, 2 Drawing, 1, 3, 4	11-12
12-1	Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Machine Design 3	Assaying, 2 (b) Drawing, 1, 3, 4	Mineralogy and Geology, 1, 2, 4, 5 Machine Design 3	Applied Chemistry	12-1

2-3	*Physical Lab'y, 3, 5 (a) Drawing, 1, 2 (b) do Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Drawing, 1, 2, 4 (b) *Organic Chemistry, 5 Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Descriptive Geometry, 1, 2, 3, 4 (a) Theory of Least Squares, 1, 2, 3 (b), 4 (b) Drawing,	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Drawing, 1, 2, 4 (b) *Practical Biology, 5	*Physical Lab'y, do Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3 (b)	3, 5 (a) 1, 4 (b) 1, 4 (a) 1, 2, 4 (a) 2 (b) 3 (b)
3-4	*Physical Lab'y, 3 (a) *Organic Chemistry, 5 Drawing, 1, 2, 4 (b) do	Field Work, 1, 2, 4 (a) *Organic Chemistry, 5 Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 Chem. Lab'y,	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b) *Practical Biology, 5	*Physical Lab'y, do Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) *Organic Chemistry, 5 Drawing, 3 (b)	3, 5 (a) 1, 4 (b) 1, 2, 4 (a) 2 (b) 5 3 (b)
4-5	*Physical Lab'y, 3, 5 (a) Surveying (Lect.) Drawing, 1, 2, 3, 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	Drawing, 1, 3, 4 Chem. Lab'y.	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3 Assaying, 2 (b) Drawing, 1, 4 (b)	*Physical Lab'y, do Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3 (b)	4-5 3, 5 (a) 1, 4 (b) 1, 2, 4 (a) 2 (b) 3 (b)

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry ; \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are in common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drawing during the remainder of the Session.

#### FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such hours as suit the laboratory work.

## FACULTY OF THE SCHOOL.

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*Principal* ..... J. GALBRAITH, M.A., LL.D.

*Registrar* . . . . . A. T. LAING, B.A.Sc.

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### MEMBERS OF TEACHING STAFF :

J. GALBRAITH, M.A., LL.D. .... *Professor of Engineering (Chairman)*

W. HODGSON ELLIS, M.A., M.B. .... *Professor of Applied Chemistry.*

A. P. COLEMAN, M.A., Ph. D . . . . . *Professor of Geology.*

L. B. STEWART, O.L.S., D.T.S. .... *Professor of Surveying and Geodesy.*

C. H. C. WRIGHT, B.A.Sc., Mem. O.A.A. . . . *Professor of Architecture.*

T. R. ROSEBRUGH, M.A. .... *Professor of Electrical Engineering.*

J. MCGOWAN, B.A.Sc. .... *Lecturer in Applied Mechanics.*

G. R. MICKLE, B.A. .... *Lecturer in Mining.*

R. W. ANGUS, B.A.Sc. .... *Lecturer in Mechanical Engineering.*

J. W. BAIN, B.A.Sc. .... *Lecturer in Applied Chemistry.*

H. G. McVEAN, B.A.Sc. .... *Demonstrator in Mechanical Engineering.*

H. W. PRICE, B.A.Sc. .... *Demonstrator in Electrical Engineering.*

W. C. TENNANT, B.A.Sc. .... *Fellow in Civil Engineering.*

J. G. McMILLAN, B.A.Sc. .... *Fellow in Mining Engineering.*

W. E. WAGNER, B.A.Sc. .... *Fellow in Mechanical Engineering.*

M. V. SAUER, B.A.Sc. .... *Fellow in Electrical Engineering.*

E. G. R. ARDAGH, B.A.Sc. .... *Fellow in Chemistry.*

A. H. MCBRIDE, Grad. S. P. S. .... *Fellow in Drawing.*

E. V. NEELANDS, B.A.Sc. .... *Fellow in Surveying.*

M. C. BOSWELL, B.A.Sc. .... *Lecture Assistant in Chemistry.*



## FACULTY.

### MEMBERS OF THE FACULTY OF ARTS :

whose classes are attended by the Regular Students of the School :

JAMES LOUDON, M.A., LL.D.....	<i>President and Professor of Physics.</i>
R. RAMSAY WRIGHT, M.A., LL.D.....	<i>Professor of Biology.</i>
ALFRED BAKER, M.A.....	<i>Professor of Mathematics.</i>
W. R. LANG, D.Sc.....	<i>Professor of Chemistry.</i>
T. L. WALKER, M.A., Ph.D.....	<i>Professor of Mineralogy.</i>
W. L. MILLER, B.A., Ph.D... ..	<i>Associate Professor of Physical Chemistry.</i>
W. J. LOUDON, B.A.....	<i>Associate Professor in Physics,</i>
C. A. CHANT, M.A.....	<i>Lecturer in Physics.</i>
J. C. MCLENNAN, B.A., Ph.D. ....	<i>Associate Professor in Physics.</i>
ALFRED T. DELURY, B.A.....	<i>Associate Professor in Mathematics.</i>
E. F. BURTON, B.A.....	<i>Fellow in Mathematics.</i>
G. R. ANDERSON, M.A.....	<i>Assistant in Physics.</i>
J. S. PLASKETT, B.A.....	<i>Assistant in Physics.</i>

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# SCHOOL OF PRACTICAL SCIENCE.

PROVINCE OF ONTARIO.

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CALENDAR FOR THE SESSION 1903-1904.

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THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments of science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction of the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor, on the 30th day of October, 1889.

By an Order-in-Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was entrusted to a council composed of the Principal as chairman, and the Pro-

tessors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

By an Order-in-Council dated the 30th day of January, 1903, the Council of the School was made to consist of the Principal, the Professors and the Lecturers, together with the Registrar.

The management and discipline of the School is vested in the Council.

By a Statute of the Senate of the University of Toronto, passed on December 14th, 1900, the teaching staff and examiners of the School of Practical Science, together with the examiners for the degree of B. A. Sc. and professional degrees in Engineering, were constituted *ex officio* the Faculty of Applied Science and Engineering of the University of Toronto.

The statute is as follows :—

By the Senate of the University of Toronto,

*Be it enacted :*

1. That the Faculty of Applied Science and Engineering be hereby established.
2. That the courses and examinations of the School of Practical Science leading to the diploma of the school and to the special certificates of the school, together with the courses and examinations leading to the degree of Bachelor of Applied Science (B. A. Sc.), Civil Engineer (C.E.), Mining Engineer (M. E.), Mechanical Engineer (M.E.) and Electrical Engineer (E.E.), be the curriculum and examinations of the University in the said faculty.
3. That the members of the teaching staff of the School of Practical Science be the members of the teaching staff of the University in the said faculty.
4. That the examiners for the School of Practical Science, whether members of the teaching staff of the said school or otherwise, together with the examiners for the degrees named in clause 2, be the examiners of the University in the said faculty.
5. That the regular students of the School of Practical Science in the first, second, third and fourth years respectively be the undergraduates of the University in the corresponding years in the said faculty.

6. That the non-regular, occasional and special students of the School of Practical Science to be the non-regular, occasional and special students of the University in the said faculty.

7. That the provisions of this statute apply, as far as may be, to all graduates of the School of Practical Science and to all graduates of the University in Applied Science and Engineering.

8. That no liability shall be incurred by the University of Toronto for the support and maintenance of the faculty hereby established.

### CHEMISTRY AND MINING BUILDING.

The new building now in course of erection on College Street is designed to accommodate the instruction in Chemistry, Electro-Chemistry, Metallurgy, Assaying, Mineralogy, Geology and Mining. The Milling building will be separate from the main building and situated on the ground now occupied by old Wycliffe College. The Geological Museum will be temporarily housed in the eastern portion of the main building.

It is expected that the new buildings will be ready for occupation in January, 1904.

### DEPARTMENTS.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz.:—

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences actual professional work.

### DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

### DEGREE OF B. A. Sc.

After the general course is finished the Diploma of the School is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

### PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), or Electrical Engineer (E. E.), as the case may be, subject to the rules and regulations established by the University.





*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School all the requirements  
thereunto relating:*

*In witness whereof we have signed this Diploma at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred and \_\_\_\_\_  
and have caused the Seal of this School to be hereunto affixed*

\_\_\_\_\_  
Chairman

\_\_\_\_\_  
Secretary

## ADMISSION.

Candidates will be admitted as regular students in any of the regular departments of instruction on presenting satisfactory certificates of having passed either :

(a) The matriculation examination in Arts, in any University in His Majesty's Dominions, or in all the subjects of such matriculation examination except Latin and Greek, provided, however, that if an alternative be allowed by the University between either Latin or Greek and modern subjects (*e.g.* Modern Languages, Physics, Chemistry, etc.), the latter subjects must be taken if the former are omitted : or

(b) The Junior Leaving Examination of the Province of Ontario, including either French or German.

The case of the University of Toronto will serve as an illustration. The subjects for pass Junior Matriculation in Arts in the University of Toronto are : English Composition, English Literature, English Grammar, Algebra, Euclid, Arithmetic, History (British, Canadian and Ancient), Latin and any two of the following : Greek, French, German, Experimental Science (Physics and Chemistry). A candidate who desires to enter the School of Practical Science as a regular student, without taking Latin or Greek, will be required to present a certificate from the Registrar that he has passed in the following subjects :—English Composition, English Literature, English Grammar, Algebra, Euclid, Arithmetic, History (British, Canadian and Ancient), and any two of the following :—French, German, and Experimental Science, (Physics and Chemistry).

Applications for admission to the regular Departments based upon other certificates than those above mentioned will be considered by the Council. Such applications accompanied by the necessary certificates and information, must be in the hands of the Registrar of the School before September 20th.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

Occasional Students will be permitted to attend such courses of instruction as the council may approve, and such students will not be required to present entrance certificates.

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

No student will be allowed to begin the work of a new term until the fees and dues of the previous term have been paid.

No application for examinations will be received until all fees and dues have been paid.

YEAR	DESCRIPTION OF PAYMENT	1.	2.	3.	4.	5.
		Civil Engineering.	Mining Engineering.	Mechanical and Electrical Engineering.	Architecture.	Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
I.	Payable in First Term—					
	Sessional Fees .....	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory .....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory .....	.....	.....	.....	.....	.....
		40 00	40 00	40 00	40 00	40 00
	Payable in Second Term—					
	Sessional Fees .....	35 00	35 00	35 00	35 00	35 00
	Total .....	75 00	75 00	75 00	75 00	75 00
II.	Payable in First Term—					
	Sessional Fees .....	40 00	40 00	40 00	40 00	40 00
	Dues—					
	Library .....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory .....	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory ....	3 00	3 00	.....	.....	3 00
		49 00	49 00	46 00	46 00	49 00
	Payable in Second Term—					
	Sessional Fees .....	40 00	40 00	40 00	40 00	40 00
	Total .....	89 00	89 00	86 00	86 00	89 00

YEAR	DESCRIPTION OF PAYMENT	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
III.	Payable in First Term—					
	Sessional Fees .....	45 00	45 00	45 00	45 00	45 00
	Dues—					
	Library.....	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General .....	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory .....		3 00			3 00
	Mineralogical Laboratory .....		3 00			3 00
		48 00	54 00	48 00	48 00	54 00
	Payable in Second Term—					
	Sessional Fees.....	45 00	45 00	45 00	45 00	45 00
	Total.....	93 00	99 00	93 00	93 00	99 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows ;

Payable in First Term—

Sessional Fees.....\$35 00

Dues, Library..... 1 00

Deposits, General..... 2 00

Payable in Second Term—

Sessional Fees..... 35 00

University Fees..... 20 00

Total.....\$93 00

Fourth year students must also pay the deposits of the laboratories in which they work.

**OCCASIONAL STUDENTS.**—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library due \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Surveying, Drawing, Analytical and Applied Chemistry, Lecture Assistant in Chemistry

Each fellowship is of the value of \$500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Registrar on or before the 1st day of May.

### REGULATIONS RESPECTING EXAMINATIONS.

All students who are candidates for diplomas or certificates shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.

Candidates are required to send to the Registrar at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in September, notice in writing of their intention to take such examinations.



No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in drawing, the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserves the right of disposing of the drawings as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.



No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

### Vacation Work.

Vacation work must be handed in, on or before the first day of the session.

Vacation notes must be on construction only, and contain not less than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not less than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

### Supplemental Examinations, Etc

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject he will be required to take a supplemental written

examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the 28th of September, 1903. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a. m. and 5 p. m. at the work laid down in the time-table.

### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, except under such circumstances as may be deemed sufficient by the Council. Application for exemption must be made in writing and the particulars of the case fully stated.

### PRIZE.

The following prize has been established :

Civil Engineering, 3rd Year, \$10 in books. Donor— Mr. T. Kennard Thomson, C. E., New York.

### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society may be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS.

(APPROXIMATE LIST )

### I Year.

#### EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Dynamics.
Euclid.	Descriptive Geometry.
Plane Trigonometry.	Surveying..... 1,2,3,4.
Analytical Geometry 1,2,3,4.	Chemistry, Elementary.
History of Architecture....4.	Mineralogy..... 1,2,4,5.
Magnetism and Electric- ity ..... 3,5.	Electricity..... 3,5.
Statics.	Heat.

#### EXAMINATIONS HELD DURING THE SESSION.

Drawing.
Field Notes ..... 1,2,4.
Architectural Sketches.....4.
Experimental Physics.....3,5.
Practical Electricity..... 3,5.
Practical Chemistry.
Practical Mineralogy..... 1,2,5.
French and German... ..5.

### II Year.

#### EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus ..... 1,2,3,4.	Strength of Materials... 1,2,3,4.
Astronomy ..... 1.	Rigid Dynamics..... 1,2,3.
Optics.	Theory of Mechanism.....3.
Hydrostatics.	Descriptive Geometry.....
History of Architecture....4.	..... 1,2,3,4.
Orders of Architecture....4.	Surveying..... 1,2,4.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

History of Ornament.....4.	Spherical Trigonometry.....
Chemistry, Inorganic and .....	I, 2, 3.
Physical .....	5. Mineralogy.....I, 2, 4, 5.
Chemistry, Applied.	Geology.....I, 2, 4, 5.
Electricity .....	3, 5. Lithology.....2.
	Metallurgy.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing .....	I, 2, 3, 4.
Field Notes.....	I, 2.
Construction Notes....	I, 2, 3, 4.
Architectural Sketches.....	4.
Experimental Physics.	
Practical Electricity ....	3.
Thesis (at beginning of session.)	
Practical Chemistry.	
Practical Mineralogy....	I, 2, 5.
Practical Lithology.....	2.
French and German .....	5.

## III Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity..3.	Theory of Construction. ....
Electricity. ....	I, 2, 3, 4.
History of Architecture ....4.	Mechanics of Machinery ....3.
History of Ornament. ....4.	Machine Design .....
Principles of Decoration...4.	Hydraulics .....
Elements of Design. ....4.	Thermodynamics.....I, 2, 3.
Method of Least Squares....	Descriptive Geometry.....
.....I, 2, 3.	.....I, 2, 3, 4.
Chemistry, Inorganic and	Practical Astronomy and Geo-
Organic. ....5.	desy.....I.
Chemistry, Applied.	Surveying and Levelling
Mineralogy and Geology....	I, 2.
.....I, 2, 4, 5.	

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- |                                   |   |
|-----------------------------------|---|
| 1. Civil Engineering.             | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.            | 4. Architecture.                          |
| Analytical and Applied Chemistry. |   |

Sanitary Plumbing, Heating and ventilation..4.	Metallurgy.....2, 5.
Theory of Compound stress	Mining and Ore Dressing..... 2.
.....1, 3, 4.	Ore Deposits..... 2.
	Assaying..... 2.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing.....	1, 2, 3, 4.
Field Notes ...	1, 2.
Construction Notes.....	1, 2, 3, 4.
Architectural Sketches.....	4.
Experimental Physics... ..	1, 3, 4, 5.
Practical Electricity.....	3.
Thesis (at beginning of session).	
Practical Chemistry.....	2, 5.
Determinative Mineralogy.....	2, 5.
Assaying.....	2, 5.

## DEPARTMENTS.

## CIVIL ENGINEERING.

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original Surveys.

## CHEMISTRY.

General principles of chemistry.  
Elementary chemistry.  
Laboratory practice.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. |   |

## MINERALOGY.

Introductory course.

## PHYSICS.

Heat.

## MECHANICS.

Statics and dynamics (with special reference to structures and machines).

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instructions in the use of the transit-theodolite, plotting, mensuration.

## II Year.

## MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)

Strength and elasticity of materials.



ENGINEERING AND SURVEYING.—*Continued.*

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location curves, etc.

Hydrographic surveying.

## MINERALOGY AND GEOLOGY.

Elements of these sciences.

Blowpipe practice.

Determination of minerals.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 27 and 45.

## III Year.

## DRAWING.

Subjects of previous years continued.

Descriptive geometry—shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, arches, etc.

## CHEMISTRY (Applied).

Explosives.

Artificial lighting.

Photography,

Industrial chemistry.

Sanitary chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

ENGINEERING AND SURVEYING.—*Continued.*

Practical designs—bridges, roofs, floors, arches, retaining walls, foundations, etc.

Thermodynamics and theory of the steam engine.

Hydraulics, sewerage, water supply.

Experimental work in engineering laboratory.

Levelling.

Profiles, cross sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.

Geodesy considering the earth a sphere.

Practical astronomy (treated in the manner required for the O.L.S. and D L.S. examinations.)

Least squares.

Electricity.

## MINERALOGY AND GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages 27 and 45.

## MINING ENGINEERING.

## I. Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographics (including isometric) and oblique projection.

Original surveys.

## CHEMISTRY.

General principles of chemistry.  
Elementary chemistry.  
Laboratory practice.

## MINERALOGY.

Introductory course.

## PHYSICS.

Heat.

## MECHANICS.

Statics and dynamics, (with special reference to structures and machines).

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

## II. Year.

## MATHEMATICS.

Differential and integral calculus.  
Spherical trigonometry.

## DRAWING.

Subjects of the first year continued.  
Coloring and shading applied to both topographical and construction drawing.  
Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.  
Machines and structures from both copies and original notes.

## CHEMISTRY.

Advanced chemistry.  
Thermo-chemistry.  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory practice.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).  
Strength and elasticity of materials.  
Experimental work in engineering laboratory.  
Transit-theodolite surveying.  
Levelling.  
Railway location, curves, etc.  
Mining surveying.

## MINERALOGY AND GEOLOGY.

Elements of these sciences.  
Blowpipe practice.  
Determination of minerals.  
Lithology.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.  
Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 27 and 45.

## III. Year

## Drawing.

Subject of previous years continued.  
Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors, etc.

## CHEMISTRY (APPLIED).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.  
Laboratory practice.  
Wet assays.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).  
Strength and elasticity of materials.  
Theory of construction.  
Thermodynamics and theory of steam engine.  
Hydraulics.  
Experimental work in engineering laboratory.  
Levelling.  
Profiles, cross-sections, field work and plotting.  
Computation of quantities.  
Mathematical theory of surveying instruments.  
Trigonometrical and barometrical levelling.  
Least squares.  
Electricity.

## MINERALOGY AND GEOLOGY.

Economic geology.  
Palæontology.  
Ore deposits.  
Blowpipe analysis and determinative mineralogy.  
Metallurgy of gold, silver, nickle, copper, etc.  
Mining and ore dressing.  
Assaying.

## VACATION WORK.

See pages 27 and 45.

## MECHANICAL AND ELECTRICAL ENGINEERING.

## I Year.

## MATHEMATICS.

Euclid, Algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, graphics.  
Descriptive geometry in its application to plane sided solids, orthographic (including isometric), and oblique projection.

CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

MECHANICS.

Statics and dynamics (with special reference to structures and machines.)

SURVEYING.

Application of trigonometry and principles of measurement (Lectures only.)

PHYSICS.

Heat.

Magnetism and electricity (introductory course.)

Electricity (applications of the laws of Ohm Kirchhoff and Joule.)

PRACTICAL ELECTRICITY.

Introductory course.

EXPERIMENTAL PHYSICS.

Introductory course.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces.

Machines and structures, (Drawings made from both copies and original notes.)

CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.



## ENGINEERING.

Statics and dynamics (pure and applied).  
Theory of mechanism.  
Strength and elasticity of materials.  
Materials of construction.  
Methods and processes.  
Experimental work in engineering laboratory.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.  
Optics.  
Electrical measurements.

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## VACATION WORK.

See pages 27 and 45.

## III. Year.

## DRAWING.

Subjects of previous year continued.  
Descriptive geometry.  
Shades and shadows, stone cutting, perspective projection.

## CHEMISTRY (APPLIED).

Explosives.  
Artificial lighting.  
Photography.  
Industrial chemistry.  
Sanitary chemistry.

## ENGINEERING.

Subjects of previous year continued.  
Applied mechanics :  
Mechanics, of machinery, machine design, thermodynamics and theory of steam engine, hydraulics.  
Electricity.  
Dynamometers and motors.

Application of principles to practical problems connected with the design, construction and testing of various prime motors and machines.

Experimental work in engineering laboratory

Least squares.

#### EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

#### ELECTRICAL LABORATORY.

#### ORIGINAL DESIGNS.

Engine and machine design.

#### VACATION WORK.

See pages 27 and 45.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principle trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

### ARCHITECTURE.

#### I. Year.

##### MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

##### DRAWING.

Copying from the flat, lettering, topography, graphics, Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.

Rendering in pencil and pen and ink.

##### CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

PHYSICS.

Heat.

MECHANICS.

Statics ( with reference to structures ).

Dynamics (preliminary to the study of hydraulics ).

SURVEYING.

Principles, chain surveying, mensuration.

HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.

II. Year.

MATHEMATICS.

Differential and integral calculus.

DRAWING.

Instrumental drawing, drawing from the cast, sketching and water color, pen and ink.

Descriptive geometry ( curved surfaces ).

CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

MECHANICS

Statics ( pure and applied ).

Strength and elasticity of materials.

Materials of construction.

Experimental work in engineering laboratory.

SURVEYING.

Use of transit and level.

Mensuration.

MINERALOGY AND GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## HISTORY OF ARCHITECTURE.

Greek and Roman.

Romanesque and Byzantine.

## ORDERS AND ELEMENTS OF ARCHITECTURE.

## HISTORY OF ORNAMENT.

Ancient.

Classic—Greek, Roman.

## VACATION WORK.

See pages 27 and 45.

## III Year.

## DRAWING.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Water color sketching.

Original designs—floors, trusses, arches, etc.

## CHEMISTRY (APPLIED).

Explosives.

Artificial lighting.

Photography.

Industrial Chemistry.

Sanitary chemistry.

## THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

Electricity.

Hydraulics.

## SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

## SURVEYING.

Levelling, setting out excavation, mensuration.

## MINERALOGY AND GEOLOGY.

Economic Geology.

## EXPERIMENTAL PHYSICS.

Heat, acoustics.

## HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

## ELEMENTS OF DESIGN.

Principles of planning with special reference to residences.

Relation between plan and elevations.

## HISTORY OF ORNAMENT.

Early Christian : Gothic and Renaissance.

## PRINCIPLES OF DECORATION.

## VACATION WORK.

See pages 27 and 45.

## ANALYTICAL AND APPLIED CHEMISTRY.

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

Copying from the flat, lettering.

Descriptive Geometry in its application to plane sided solids.

Orthographic (including isometric) and oblique projection.

Model drawing.

## CHEMISTRY.

General principles of chemistry.

Elementary chemistry.

Laboratory practice.

## MINERALOGY.

Introductory course.

## MECHANICS.

Statics and dynamics.

## PHYSICS.

Heat.

Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

Introductory course.

## PRACTICAL ELECTRICITY.

Introductory course.

## II Year.

## CHEMISTRY.

Inorganic and physical chemistry.

Applied chemistry.

Laboratory work in quantitative and qualitative analysis.

## MINERALOGY AND GEOLOGY.

Elementary mineralogy and blowpipe practice.

\*Physical geography, palæontology and geology.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

Electricity.

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## MODERN LANGUAGES.

Students in this and the following years are expected to be able to read chemical books in French and German.

## VACATION WORK.

See pages 27 to 45.

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\*An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.



## III. Year.

## CHEMISTRY

Organic chemistry and chemical physics.  
 Applied chemistry.  
 Laboratory work.

## MINERALOGY AND GEOLOGY.

† Economic geology.  
 Blowpipe analysis and determinative mineralogy.

## METALLURGY.

Gold, silver, nickel, copper, lead.

## EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

## BIOLOGY.

## VACATION WORK.

See pages 27 to 45.

## VACATION WORK.

## THESIS AND CONSTRUCTION NOTES.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next annual examination.

## CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—County and Suburban Roads.

“ THIRD YEAR.—The Disposal of City Wastes—Sewage, Garbage, etc.

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† An option is permitted between above subject and Physical Chemistry in the University of Toronto.

**Books of Reference.**

Byrne—Highway Construction.

Judson—City Roads and Pavements.

Shaler—American Highways.

Spalding—Roads and Pavements.

Rafter and Baker—Sewage Disposal in the United States.

**MINING ENGINEERING.**

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

“ THIRD YEAR.—Mining.

**Books of Reference.**

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

SUBJECT OF THESIS FOR SECOND YEAR.—Machine Shop. Practice.

“ THIRD YEAR.—Foundry Practice.

**Books of Reference.**

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

**ARCHITECTURE.**

For the Second year the following set of freehand pencil sketches is required:—

I. Doorway from the object.

II. Staircase “

III. Fireplace with cross section.

And seven sheets from the object, prints, or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.

“ THIRD YEAR—Twelve water-color studies

**ANALYTICAL AND APPLIED CHEMISTRY.**

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid Manufacture.

“ THIRD YEAR.—Manufacture of Chlorine, Bleaching Powder and Caustic Soda.

**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observation should be given.

**THE FOURTH YEAR.**

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of elective and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an under-graduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

- A. { Astronomy.  
Geodesy and Metrology.
- B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.
- C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.
- D. { Mineralogy and Geology.  
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will not be allowed to take less than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Registrar of the school in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year. . . . . 900

Subdivided as follows :—

Work (reckoned in hours) . . . . . 540 marks

Records (notes, drawings, etc) . . . . . 360 marks

#### FOR PASS.

The minimum percentages are :—

Work, 75 per cent . . . . . 405 marks

Records, 50 per cent . . . . . 180 "

And two-thirds of the total marks assigned.... 600 "

#### FOR HONORS :

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statute of the University of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they affect the degree of B. A. Sc.

#### DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made is as follows :

**By the Senate of the University of Toronto.**

*Be it enacted :*

That the Degree of Bachelor of Applied Science (B.A. Sc.) be hereby established to be granted subject to the following conditions and regulations :

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.

Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis must be sent to the Registrar not later than the day preceeding the first day of the annual examinations and is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent. and to take honors seventy-five per cent. of the marks assigned.

4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.

A. { Astronomy.  
Geodesy and Metrology.

B. { Architecture.  
Strength and Elasticity of Materials.  
Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.

C. { Industrial Chemistry.  
Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry.

D. { Mineralogy and Geology.  
Metallurgy and Assaying.

The sub-division "Inorganic and Organic Chemistry" will be obligatory on all candidates who select Group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent. of the marks assigned will be required.

5. The degree with honors will be conferred on candidates who obtain three out of the four honors possible, viz :

Certificates with honors ..... (cl. 2)

Thesis with honors ..... (cl. 3)

Honors in each subject of examination ..... (cl. 4)



6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual or supplemental examinations an application for examinations according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in April, and the supplemental examinations in September.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the day preceding the first day of the examination.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis, drawings, and other papers accompanying them, shall be the property of the School of Practical Science.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate, and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

#### SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896 :

By the Senate of the University of Toronto.

*Be it enacted :*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degrees be hereby established, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.).
- III. That the following be the conditions and regulations governing the conferring of the said degrees.

1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause 11 hereunder.
2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree.
3. Intervals of non-employment or of employment in other branches of engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
4. Satisfactory evidence shall be submitted to the University examiners as to the nature and length of the candidates' professional experience for the purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidates may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the first day of April.

8. The candidate shall be required to present himself for examination in the month of April at such time as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the School of Practical Science.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.

For further particulars apply to the Registrar of the University of Toronto.

For the better carrying out of the provisions of the above statute the following statute constituting the Board of Examiners for professional degrees in Engineering was passed by the Senate on December 14th, 1900.

By the Senate of the University of Toronto—

*Be it enacted :*

1. That the Examiners for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), and Electrical Engineer (E.E.), be appointed at least twelve months in advance of the date of the examinations for which their services are required.
2. That the said Examiners constitute the Board of Examiners for degrees in Engineering.
3. That the members of the Board shall select one of their number to act as chairman, within one month from the date of their appointment.
4. That candidates for examination applying to the Registrar for information respecting the nature or details of the examinations for the said degrees, shall be directed by him to communicate with the chairman of the said Board, who shall forward to the candidates either directly or through the Registrar the decision of the Board.

5. That the Chairman of the said Board shall keep a record book in which he shall enter the minutes of the proceedings of the Board. He shall also keep a file in book form of all correspondence with candidates for examination and other official correspondence; and shall at the close of the examination transmit to the Registrar a copy of the said minutes and correspondence.
6. That at the close of the examinations the Board shall forward a report of the results to the Registrar for transmission to the Senate. The report shall be signed by the Examiners or by the Chairman of the Board on their behalf.
7. That the Registrar shall furnish each Examiner on his appointment with a copy of this statute and a copy of the statute respecting degrees in Engineering.

**Extract from the Provincial Act Respecting Land Surveyors and Survey of Lands. (R.S.O.)**

“ 10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practicing Ontario Land Surveyor.

“ 14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but

shall only be required to serve under articles with a practicing land surveyor duly filed as required by section 17 of this Act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his apprenticeship may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practicing Ontario Land surveyor.

**Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.



## Extract from The Ontario Architects' Act.

"Any student who has matriculated in Arts in any University in His Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

"23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

"24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

"(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to be a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Registrar upon payment of such fees as the council may by regulation direct."

## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

### Subjects Taught by the Faculty of the School.

Subjects.	Instructors.
Organic and Inorganic Chemistry,	{ W. H. Ellis, M. A., M. B., Professor. J. W. Bain, B. A. Sc., Lecturer. <sup>†</sup> E. G. R. Ardagh, B. A. Sc., Fellow.
Applied Chemistry,	
Assaying.	
Mineralogy, Geology,	{ A. P. Coleman, M.A., Ph. D., Professor. G. R. Mickle, B.A., Lecturer. J. G. McMillan, B.A.Sc., Fellow.
Petrography,	
Metallurgy,	
Mining and Ore-dressing,	
Milling,	
German.	



Subjects Taught by the Faculty of the School—*Continued.*

Subjects.	Instructors.
Dynamics, Strength of Materials, Theory of Construction, Machine Design, Compound Stress, Hydraulics, Thermodynamics, and Theory of the Steam Engine, French.	J. Galbraith, M.A., LL.D., Professor. J. McGowan, B.A., B.A.Sc., Lecturer. R. W. Angus, B.A.Sc., Lecturer. H. G. McVean, B.A.Sc., Demonstrator.
Statics, Drawing, Architecture, Plumbing, Heating and Ventilation, Mortars and Cements, Brick and Stone Masonry.	C. H. C. Wright, B.A. Sc. Professor. A. H. McBride, Grad. S.P.S., Fellow. W. E. Wagner, B.A.Sc., Fellow. W. C. Tennant, B.A.Sc., Fellow.
Surveying, Geodesy and Astronomy, Spherical Trigonometry, Least Squares, Descriptive Geometry.	L. B. Stewart, D. T. S., Professor. E. V. Neelands, B.A. Sc., Fellow.
Electricity, Magnetism, Dynamo-Electric Machinery, Theory of Mechanism, Mechanics of Machinery, Rigid Dynamics.	T. R. Rosebrugh, M. A., Professor. H. W. Price, B.A.Sc., Demonstrator. M. V. Sauer, B. A. Sc., Fellow.

## Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy.	Alfred Baker, M.A., Professor. A. T. DeLury, B.A., Associate Professor. E. F. Burton, B.A., Fellow.
Sound, Heat, Electricity and Magnetism, Hydrostatics.	James Loudon, M.A., LL. D., Professor. W. J. Loudon, B.A., Associate Professor. C. A. Chant, M.A., Lecturer. J. C. McLennan, B.A., Ph. D., Associate Professor. G. R. Anderson, M.A., Assistant. J. S. Plaskett, M.A., Assistant.
Biology, Mineralogy.	R. Ramsay Wright, M.A., Professor. T. L. Walker, M.A., Ph. D., Professor

## DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

## Text Books and Books of Reference

Angel - Plane and Solid Geometry.

Binn—Orthographic Projection.

Church—Descriptive Geometry (*a*), (*b*).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*)

Vere Foster—Copy Book No. 10 (*a*).

Warren—Stone Cutting (*c*).

Worthen—Topographical Drawing.

## SURVEYING AND LEVELLING.

## LAND SURVEYING.

Chain surveys.

Compass and theodolite surveys.

Method of keeping field notes.

Determination of heights and distances.

Plotting.

## LEVELLING.

Longitudinal and cross sections.

Plotting.

## SETTING OUT.

Setting out straight lines and curves.

Setting out levels.

## MENSURATION.

Lines, surfaces and solids.

Timber, masonry, iron and earthwork.

Capacity of Reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

### Text Books.

Brough—Mine Surveying (*b*), (*c*).

Gillespie—Higher Surveying (*b*), (*c*), (*d*).

Henck or Searle—Railway Curves (*b*), (*c*).

Johnson—Theory and Practice of Surveying.

Murray—Manual of Land Surveying (*a*).

## PRACTICAL ASTRONOMY AND GEODESY.

### ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map construction are based upon supposition that earth is a sphere.

### ADVANCED COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors. It is distinguished from the work of the ordinary course not so much by the subjects as by the degree of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

### Text-Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher Surveying (*b*), (*c*), (*d*).

Gore—Elements of Geodesy (*c*), (*d*).

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First year text-books (*a*), Second year (*b*), third year (*c*), Fourth year (*d*).

Green—Spherical and Practical Astronomy (*c*), (*d*).

Helmert—Höhere Geodasie.

Nauticel Almanic, 1902 (*c*), (*d*).

### APPLIED MECHANICS.

#### STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

#### THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

#### THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—arches, retaining walls, roofs, bridges, etc.

#### DYNAMICS.

Representation and measurements of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc., etc.

#### STRENGTH OF THE PARTS OF MACHINES.

#### MACHINE DESIGN—

#### HYDRAULICS.

Discharge of water through orifices, notches, etc.

Flow in pipes and open channels. Sewerage, water-works, water-power, water-wheels, turbines, pumps, etc.

#### THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

#### Text-Books and Books of Reference.

Baker—Masonry Construction (*d*).

Billings—Heat and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc. (*d*).

Carnegie Pocket Companion.

- Carpenter—Heating and Ventilation of Buildings (*c*).  
 “ Experimental Engineering (*a*).  
 Du Bois—Graphic Statics.  
     Strains in Frames Structures.  
 Gerhardt—House Drainage and Sanitary Plumbing (*c*).  
 Greene—Trusses and Arches.  
 Innes—Centrifugal Pumps, Turbines and Water Motors (*d*).  
 Johnson—Modern Framed Structures (*c*), (*d*).  
 “ Materials of Construction (*d*).  
 Kennedy—Mechanics of Machinery (*b*), (*c*).  
 Kidder—Building Construction and Superintendence.  
 “ Architect and Builders’ Pocket Book.  
 Lanza—Applied Mechanics.  
 Low and Bevis—Machine Drawing and Design (*b*), (*c*).  
 Low—Machine Drawing (*a*), (*b*), (*c*).  
 Merriman and Jacoby—Roofs and Bridges.  
 Merriman—Mechanics of Materials (*b*), (*c*), (*d*).  
 “ Hydraulics (*c*), (*d*).  
 Patton—Foundation (*d*).  
 Peabody—Thermodynamics (*d*).  
 “ Steam Tables (*d*).  
 Rafter and Baker—Sewage Disposal in the United States.  
 Rankine—Applied Mechanics (*c*), (*d*).  
 Reuleaux—The Constructor.  
 Santo Crimp—Sewage Disposal Works.  
 Shann—Elementary Treatise on Heat (*c*), (*d*).  
 Trautwine—Engineer’s Pocket Book.  
 Unwin—Elements of Machine Design (*c*).  
 “ Testing of Materials of Construction.  
 Von Ott—Graphic Statics (*a*).  
 Williamson—Elasticity (*d*).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

**Text-Books and Books of Reference.**

Auchincloss — Valve and Link Motions (*c*).

Goodeve — Elements of Mechanism (*b*).

Halsey—Side Valve Gears.

Kennedy—Mechanics of Machinery (*b*). (*c*).

Rankine — Machinery and Millwork.

Reuleaux — Kinematics of Machinery.

**ELECTRICITY.**

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises —

ELEMENTARY ELECTRICITY AND MAGNETISM.

MEASURING INSTRUMENTS—

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

MATHEMATICAL THEORY OF ELECTRICITY.

APPLICATIONS OF ELECTRICITY —

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.

**Text-Books and Books of Reference.**

Bedell & Crehore—Alternating Currents.

Carhart & Patterson—Electrical Measurements (*b*), (*d*).


Bedell — Principles of the Transformer (*d*).

Fleming—Alternate Current Transformers, Vols. I and II (*d*).

Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe — Electrical Testing (*b*)

Loudon & McLennan—Practical Physics (*b*)

 Stewart & Gee—Practical Physics.



Thompson, S. P.—Elementary Electricity and Magnetism.

“ —Dynamo Electric Machinery.

“ —Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE —

Egyptian, Assyrian and Persian.

Classic.

Romanesque and Byzantine.

Gothic.

Renaissance.

### ORDERS OF ARCHITECTURE.

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

#### Text-Books and Books of Reference.

Fergusson—History of Architecture,

Fletcher—A History of Architecture.

Gwilt—Encyclopædia of Architecture.

Leeds—Orders of Architecture (*b*).

Osborne—Art of House Planning (*d*)

Owen Jones—Grammar of Ornament.

Racinet—L'Ornament Polychrome.

Rickman—Gothic Architecture.

Sharpe—Seven periods of Church Architecture.

Smith, T. Roger—Classic and Early Christian Architecture (*a*), (*b*).

Smith, T. Roger—Gothic and Renaissance (*c*).

Stratham—Architecture for General Readers.

Sturgis—European Architecture.

Vignole—The Five Orders of Architecture (*b*), (*c*).

### MATHEMATICS AND PHYSICS.

The pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

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First year text-books (*a*), Second year (*b*), Third year (*c*), Fourth year (*d*).

## Text Books and Books of Reference.

- Ganot—Physics (*b*).  
 Hall & Knight—Plane Trigonometry (*a*).  
 Loomis—Calculus (*b*).  
 Loudon & McLennan—Practical Physics (*b*).  
 Mackay—Elements of Euclid (*a*).  
 Newcombe & Holden—Astronomy (*b*).  
 Osborne—Calculus.  
 C. Smith—Conic Sections (*a*).  
 Hamblin Smith—Hydrostatics (*b*).  
 Balfour Stewart—Heat.  
 Todhunter—Algebra (*a*).  
 “ —Spherical Trigonometry (*b*).  
 Tyndall—Sound.

## CHEMISTRY.

## COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

- Elementary chemistry.  
 Applied chemistry.  
 The chemistry of combustion, fuels, furnaces,  
 artificial lighting, explosives, photography, build-  
 ing materials, water, air, sewage, chemical  
 manufactures.  
 Laboratory work, including technical analysis, the  
 analysis of food, water and air, and toxicology.

## COURSES IN THE UNIVERSITY OF TORONTO.

- Organic Chemistry.  
 Chemical theory.  
 Physical chemistry.

## Text Books and Books of Reference.

- Allen—Commercial Organic Analysis.  
 Arnold—Steel Works Analysis.  
 Beilstein—Organic Chemistry.  
 Beringer—Text Book of Assaying.  
 Blair—Chemical Analysis of Iron and Steel.  
 Blount—Electro-Chemistry.  
 Bloxam—Chemistry.

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First year text-books (*a*), Second year (*b*), Third year (*c*), Fourth year (*d*).

Bloxam & Blount—Chemistry for Engineers and Manufacturers.

Blyth, A. W.—Poisons.

“ —Foods.

Bolley—Handbuch der Chemischen Technologie.

Dammer—Handbuch der Anorganischen Chemie.

Douglas and Johnston—Qualitative Analysis.

Fresenius—Qualitative and Quantitative Analysis.

Furman—Manual of Practical Assaying.

Hempel—Gas Analysis.

Holleman — Inorganic Chemistry.

Jones—Practical Chemistry.

Lord—Notes on Metallurgical Analysis.

Lunge—Sulphuric Acid and Alkali.

“ —Coal Tar and Ammonia.

Meyer—History of Chemistry.

Morgan—Elements of Physical Chemistry.

Newth—Manual of Chemical Analysis.

Ostwald—Lehrbuch der Allgemeinen Chemie.

“ —Outlines of General Chemistry.

“ —Principles of Inorganic Chemistry.

Pattison Muir—Thermo-chemistry, elements of.

Poole—Calorific value of Fuels.

Post—Chemisch-technische Analyse.

Remsen—Inorganic and Organic Chemistry.

Richter—Inorganic and Organic Chemistry.

Roscoe & Schorlemmer—Treatise on Chemistry.

Sadtler—Organic and Applied Chemistry.

Sutton—Volumetric Analysis.

Thorp—Outlines of Industrial Chemistry.

Thorpe—Dictionary of Applied Chemistry.

Thorpe—Quantitative Analysis.

Wagner—Chemical Technology.

Walke—Lectures on Explosives.

Watt—Dictionary of Chemistry.

Wiechman—Sugar Analysis.

Winkler—Gas Analysis.

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First year text-books (a), Second year (b), Third year (c), Fourth year (d).

## MINERALOGY, GEOLOGY AND METALLURGY.

1. Mineralogy and Geology.
  - Mineralogy and crystallography.
  - Geology and palæontology.
  - Petrography.
  - Physical geography.
  - Blowpipe Analysis.
  - Determinative mineralogy.
2. Mining and Metallurgy.
  - Mining Geology.
  - Ore dressing.
  - Metallurgy of iron and steel.
  - Metallurgy of nickel, copper, silver, etc.
  - Assaying.
  - Milling.

**Text Books and Books of Reference.**

Chapman or Brush—Mineral Tables.  
 Chapman—Mineralogy and Geology of Canada.  
 Crosby—Determination of Minerals.  
 Dana—Manual of Geology.  
 Furman—Assaying.  
 Geikie—Text-Books of Geology.  
 Harker—Petrography.  
 Howe—Metallurgy of Steel.  
 Ihlseng—Manual of Mining.  
 Kemp—Handbook of Rocks.  
 Kemp—Ore Deposits of the United States.  
 Kuhnhardt—Ore Dressing.  
 Nicholson—Palæontology.  
 Peters—Modern Copper Smelting.  
 Phillips—Ore Deposits.  
 Phillips and Bauerman—Elements of Metallurgy.  
 Plattner—Manual of Blowpipe Analysis.  
 Roberts-Austen—Metallurgy.  
 Rose—Metallurgy of Gold.  
 Rosenbusch—Petrography.

### STEAM ENGINE LABORATORY.

The equipment of this department is as follows :

A Babcock & Wilcox 52 h.p. boiler.

A Harrison-Wharton 12 h.p. boiler.

A 50 h.p. Brown engine. This engine was constructed specially for experimental investigations. It is steam jacketed and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser, the latter of which was kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump and a Blake feed pump, the latter of which was a gift from the manufacturers. In addition there are the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers, anemometers, thermometers, a platinum and platino-rhodium thermo-couple, etc., etc.

### HYDRAULIC LABORATORY.

This laboratory contains two large steel tanks arranged for the experimental study of the flow of water through orifices and over weirs. Both orifices and weirs may be conveniently changed.

The discharge is measured by two tanks which are filled and emptied alternately by means of four valves operated by a single lever, thus enabling the measuring to be continued for any length of time without interrupting the flow.

The water is supplied by a three-throw pump with double acting cylinders, having a capacity of 500,000 gallons per 24 hours.

For the work on turbines etc., a six-inch new American turbine, the gift of the firm of William Kennedy & Sons, Owen Sound, has been set up so that efficiency determinations under different gate openings and heads may be made. In addition to this there is a thirty-six inch axial impulse turbine, and a Pelton wheel, each being provided with suitable brakes, means of accurately measuring the discharge continuously, and other requirements for experimental work. There are also two centrifugal pumps, one made by the Morris

Machine Works, the other having been kindly presented to the school by The Northey Co., Limited, Toronto, the manufacturers. A dynamometer and other necessary apparatus are provided for adapting these pumps to scientific investigations.

A Venturi meter has also been installed, and apparatus has been arranged so that the discharge from different forms of nozzles, and the frictional losses in elbows, valves, etc., may be determined.

There are the usual measuring instruments, gauges, guage-testing apparatus, scales, brakes and dynamometers, and a nine-inch McCormick turbine.

### STRENGTH OF MATERIALS LABORATORY.

The machines in this department are the following :

An Emery 50-ton machine, built by William Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 10-ton universal testing machine.

An Olson torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity adapted to specimens up to 48 inches in length.

A Riehle abrasion machine, for testing the resistance to attrition of stones, brick, etc.

Extensometers of the Bauschinger, Unwin, Marshall and other types besides a large number of micrometers and scales.

The shop is equipped with a number of high-class machine tools specially fitted for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs and for making special apparatus for original investigation.

### CEMENT TESTING LABORATORY.

This department is fitted with all the usual molds, gravimeters, tables and tank accommodation necessary in a well equipped laboratory.



In this laboratory there are also the following :

A Riehle 2,000-pounds machine, fitted for either tension or compression.

A Riehle 600-pounds machine fitted for tension only.

An extra large Faija's hot bath apparatus.

### METROLOGICAL LABORATORY.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length ; a 10-foot Rogers comparator with a graduating attachment ; a Kater's pendulum with vacuum chamber ; a Howard astronomical clock and electro-chronograph ; a sidereal chronometer, a Troughton & Simms 10-inch theodolite, eight surveyor's transits, seven levels, compasses, sextants, plane tables, micrometers, planimeters, etc. ; and all the necessary field instruments.

### ELECTRICAL LABORATORY.

In one section of this laboratory a 20 kilowatt Edison motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, a Westinghouse experimental alternator, and a rotary converter when used as a polyphase dynamo. Of direct current motors, besides the one already mentioned, there are a Crocker-Wheeler machine and a 6 h.p. Edison motor, used in the mill-room, but available for testing ; besides fan motors. Of alternating current motors there are a General Electric three-phase induction motor and a single-phase induction motor with condensor compensator, besides a special experimental polyphase induction motor of  $7\frac{1}{2}$  h.p., by the same company, in which the rotor terminals are all separately accessible. A revolving field for the latter machine makes it a general form of polyphase generator. There are also a Wagner single phase induction motor and a G. E. constant current transformer with a series of six arc lamps. Other types are represented by fan motors. A marble switchboard in this room facilitates connection between different circuits, both locally and for other parts of the building. It is supplied with 110 and 220 volts, direct current, and the same voltage of alternating current of 60 cycles from the city circuits, in addition to the range of

supply that may be had from our own generators and storage cells. Four switches which may be connected in any of the circuits, two sets of bus-bars for paralleling, automatic circuit breakers, arc and incandescent lamp circuits; and controlling rheostats are also connected to the switchboard.

Another section is the galvanometer room, in which are ten masonry piers to support instruments in such a way as to be free of vibration.

An adjoining room is the laboratory for advanced work, in which may be mentioned a Kelvin Balance and its rheostat, and an enclosure within which experiments with high voltages may be safely performed. Marble switch boards are placed in this room, and in the galvanometer room to connect with "Chloride" storage batteries of large and small cells located on a gallery in a separate room, and apparatus for convenience in standardizing measuring instruments is available.

Among the instruments and apparatus may be mentioned. Numerous D'Arsonval galvanometers of Carpentier, Rowland and other designs, ballistic galvanometers, a Thomson galvanometer, telescopes and scales, divided microfarad condenser, Kempe discharge key, rheostats and proportional arms for Wheatstone bridge and other purposes, slide wire metre bridges, including special bridge for electrolytic resistance; standard resistances, including megohm, 10 ohms, several copies of the ohm, divided ohm, and a complete set of standards from one hundred thousand ohms down to one thousandth ohm, certified by the Charlottenburg Reichsanstalt, the latter with oil bath and stirrer; Willyoung potentiometer, standard cells, Clark and Helmholtz, Kohlrausch tubes for measurement of electrolytic resistance, Lippmann electrometers, Kelvin-Mascart electrometer, Nernst electrometer. Besides these are numerous Weston instruments including wattmeters, voltmeters for direct and alternating current, ammeters, and milliammeters, Thomson and Whitney ammeters and voltmeters, three Siemens electro-dynamometers, Kelvin balance, Kelvin high potential electrostatic voltmeter, and electrostatic multicellular voltmeter; Thomson recording wattmeters (including one for three phase), Shallenberger recording ammeter; lightning arresters, Westinghouse, Stanley, Wagner and Thomson-Houston transform-

ers ; a General Electric 10,000 volt testing transformer, and a low voltage 1,000 ampere transformer, high potential condenser, Wimshurst influence machine, Ruhmkorff coils, Crookes' tubes, fluoroscope, Braun tube wireless telegraph apparatus ; Hopkinson permeameter for testing the magnetic qualities of iron, instruments for measuring instantaneous current and voltage in alternating current circuits according to Duncan, Fessenden contact maker, earth inductor, Ayrton and Perry secohmmeter, fixed and variable standards of inductance, double sets of telegraph and telephone apparatus ; Lummer-Brodhun and Bunsen photometers with accessories for arc and incandescent light photometry and Hefner standard amyl-acetate lamp. Voltmeters of all the usual forms, balances, thermometers, portable rheostats and numerous minor appliances complete this portion of the equipment. Among arc lights may be mentioned the Manhattan, Upton, Adams-Bagnall, Toerring, Thomson, Safford and United Electric long burning enclosed arcs, Thomson and other lamps for alternating current, the Ward and Universal (two in series of 110 volt circuits). Thomson-Houston and Ball for series circuits and one the gift of W. A. Turbayne.

#### MINERALOGICAL LABORATORY.

This laboratory contains a collection of hand specimens of minerals and rocks for the purpose of training students in handling and becoming familiar with the more common varieties of both ; it is also provided with balances for determining the specific gravity of minerals.

Blow pipe instruction is given here, there being seating room, blow pipe burners and accommodation for thirty-six students working at once.

#### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two Brown coke furnaces for crucibles and muffles, two pulverizers, a muller, and all other necessary appliances for pulverizing and preparing ores for fire assay. The pulp balances for weighing charges and the delicate balances for weighing gold and silver buttons are kept

in a room opening off the assay laboratory. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope ; also the necessary appliances for making rock sections by hand. Six petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silver copper plates, and a Frue Vanner. The concrete floor of the mill-room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse power Edison motor, which is supplied with current from the city circuit. The mill-room is also provided with settling tanks for the tailings and concentrates, a pair of Hamilton rolls for dry crushing, and an automatic sampler.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill-room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a large brick assay furnace and a reverberatory furnace for roasting sulphide and arsenical ores ; leaching vats for treating ores by the cyanide process, and a chlorination barrel.

### CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratory will accommodate about 20 students. It is furnished with convenient work tables, and fume cupboards, and supplied with the most recent apparatus



for gravimetric, volumetric and gasometric analysis, both scientific and technical. Besides balances by the best makers, and of the most recent construction, furnaces for fusion, organic analysis, etc., and all the requisites for the assays of ores, furnace and other technical products in the wet way, the apparatus includes an experimental vacuum pan, a filter press, the latest forms of Fischer's, Mahler's, Junker's and Carpenter's apparatus for the determination of the heating power of fuel, facilities for the electrolytic determination of metals, including a Gulcher thermo-electric pile; spectrosopes, polarscopes and microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

In addition there is also a laboratory for gas analysis and calorimetric work.

### PHYSICAL LABORATORY.

#### University of Toronto.

The physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

### MUSEUMS.

The Geological Museum includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the Province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive schistose and sedimentary rocks; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The palæontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

### LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference in the subjects of study pursued in the school has been formed and is being added to year by year.

### LIST OF DONORS TO THE LIBRARY.

American Society of Civil Engineers—Proceedings.

Association of Engineering Societies—Journal.

Blackwood, A. E.—Stone.

Bureau of Mines—Report.

Canadian Mining Institute—Journal.

Columbia University—Quarterly.

Department of Mines, Nova Scotia—Report.

Geological Survey of Canada—Report.

Gzowski, Estate of the late Sir Casimir—

Transactions of American Society of Civil Engineers, 1874-1898.

Transactions of Canadian Society of Civil Engineers, vol. 1., 1887—vol. XII., 1898.



Proceedings of The Institution of Civil Engineers, vol. LXIII., 1880—vol. CXXXII., 1898.

Institution of Engineers and Shipbuilders in Scotland—Transactions.

Institution of Junior Engineers—Transactions.

Institution of Mechanical Engineers—Proceedings.

Royal Institute of British Architects—Journal and Proceedings.

Society of Chemical Industry—Journal.

Société des Ingénieurs Civils de France—Mémoires.

United States Coast and Geodetic Survey—Report.

United States Government Tests of Metals, etc.—Report.

University of Toronto—Studies.

## THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

### Officers for 1903-1904.

President .....	J. F. Hamilton.
Vice-President .....	J. J. O'Sullivan.
Recording Secretary.....	W. E. Wickett.
Treasurer.....	J. M. Wilson.
Corresponding Secretary.....	P. M. Sauder.
Editor ...	To be appointed.
Librarian .....	P. C. Coates.
Assistant Librarian .....	J. P. Charlebois.
Graduates' Representative.....	J. F. S. Madden.
Fourth Year do .....	J. A. McFarlane.
Third Year do .....	H. L. Chilver.
Second Year do .....	C. E. Sisson.
First Year do .....	To be elected.

The Society meets every second Tuesday during the Academic Year. Papers are read, and discussions are held on engineering subjects. The Society publishes a pamphlet annually, containing the best papers read at the meetings.

### LODGING AND BOARD.

Accommodation is readily obtainable in numerous private boarding-houses within convenient distance of the School, at a cost of from three dollars upwards for comfortable lodging with board; or rooms may be rented at a cost of from one dollar per

week upwards, and board obtained separately at moderate rates. A list of accredited boarding houses is kept by the Secretary of the University College Young Men's Christian Association, and students are recommended to consult him with reference to the selection of suitable accommodation.

### GYMNASIUM AND ATHLETIC GROUNDS.

*(From the Calendar of the University of Toronto.)*

"The University Gymnasium was completed and equipped in 1893. It is fully provided with the best and most modern appliances for physical culture, and contains a running track, shower baths and swimming bath, besides the necessary dressing rooms and other conveniences. A competent instructor in gymnastics is in constant attendance to superintend and direct the exercises of students. In addition to the lawn in front of the Main University Building and a campus in the rear, a large plot of ground on Devonshire Place has been set apart as an athletic field. By this addition the facilities for football, cricket, tennis and other out-door athletic sports are doubled, as compared with previous accommodation; and by these grounds, in conjunction with the gymnasium, ample opportunity is afforded to all students for healthful exercise and physical development. To assist in meeting the expenses of the gymnasium, a nominal annual fee is imposed on those who avail themselves of its advantages. The supervision of all athletic matters has been intrusted by the Councils to an Athletic Board, consisting of six members appointed from the Faculty and the officers of the Athletic Association. All applications of clubs for the use of grounds must be made annually to this Board. All such applications must be accompanied by a list of officers. In the case of new clubs the list of officers must be accompanied by particulars as to the organization and objects of the club making application.

### UNIVERSITY OF TORONTO ATHLETIC ASSOCIATION.

#### DIRECTORATE.

*(From the Calendar of the University of Toronto.)*

Pres.—President Loudon, L.L. D.

Vice-Pres.—W. B. Hendry, B. A.

Sec.-Treas.—W. G. Wood.

Dir. — Professor McCurdy.

Dir.—Rev. D. B. Macdonald.

“ J. H. Chown,

“ W. Elwell.

“ S. P. Biggs,

“ Prof. C. H. C. Wright,

The athletic association is now the paramount body in University Athletics, and has entire jurisdiction over the athletic clubs using the University name, and over their finances, members, and policy, subject to the University authorities. Henceforth no financial agreement can be entered into by any such club without the sanction of the Directorate. No expenditure of any kind in connection with any such club can be made without the written order of the Secretary-Treasurer of the Directorate.

### STUDENTS' UNION BUILDING.

*(From the Calendar of the University of Toronto.)*

“ In 1894, additions were made to the front of the building in which the Gymnasium is situated, consisting of a large hall for public meetings, a reading room and committee rooms. This additional accommodation is available for the work of the various student societies and for academic purposes. Applications for the use of rooms, accompanied by a list of officers and a copy of the constitution of the society making application, must be made, through the President, to the joint committee of the Councils on Gymnasium and Students' Union Building, at the beginning of the season, or from time to time as occasion requires. Arrangements have also been made by which recognized societies may obtain the use of committee-rooms on application to the janitor of the Students Union Building.

### SCHOOL OF PRACTICAL SCIENCE ATHLETIC ASSOCIATION.

#### Executive Committee 1903-04.

Honorary President.....	J. McGowan, B. A.
President.....	W. H. Young.
Vice-President.....	R. A. Bryce.
Secretary-Treasurer....	W. R. Worthington.
IV. Year Representative.....	B. B. Patten.
III. “ “ .....	F. Burnham.
II. “ “ .....	F. F. Dowling.
I. “ “ .....	To be elected.

The athletic association is the ruling body in School athletics and has full control over all athletic clubs using the School name. The Executive Committee has power to suspend any one from the privileges of membership in the association for any breach of its regulations and controls the finances of all athletic clubs in the School. The annual membership fee of this association is fifty cents.

No other monies are collected for the support of athletics in the school without the sanction of the Executive Committee.

### RUGBY FOOTBALL.

The Mulock Cup, which was presented by the Hon. Wm. Mulock, M. A., LL. D., to the University of Toronto Rugby Foot-ball Club for inter-college competition, brings out each year a large number of contestants from the University and affiliated colleges.

#### Rugby Football Club of the School of Practical Science.

#### OFFICERS.

Hon. President.....	Principal Galbraith.
President.....	A. E. Gibson.
Sec.-Treas.....	H. F. White.
Manager of senior team.....	J. Smith.
Captain of senior team.....	R. A. Bryce.
Manager of junior team.....	H. W. Evans.
Captain of junior team.....	H. B. Housser.

#### LIST OF PLAYERS.

##### SENIOR TEAM.

Alison, J. G. R.	Lang, A. G.
Bryce, R. A. (Capt.)	Robinson, L
Bonnell, M. B.	Rutherford, F. N.
Burnham, F.	Sauder, P. M.
Burwash, N. A.	Small, H. S.
Coulson, C. L.	Smith, J. H. (Mgr )
Clarke, F. F.	White, H. F.
Ingles, J.	

## JUNIOR TEAM.

Winners of Mulock Cup.

Alport, F.	Housser, H. B. (Capt.)
Baldwin, F. W.	McGiverin, F. A.
Bevan, W. H.	Montague, F. F.
Dill, A. W.	Morden, L. W.
Fletcher, H. M.	Power, C. W.
Fletcher, W.	Racey, G. W.
Ford, E. A.	Reynolds, G. B.

## ASSOCIATION FOOTBALL.

In order to encourage Association Football on the College Campus, the Faculty of the University of Toronto presented a cup, known as the Faculty Cup, to the Inter-College Association Football Club for annual competition among the University and affiliated colleges.

Association Football Club of the School of Practical Science.

## OFFICERS.

Hon. President .....	Prof. L. B. Stewart, D.T.S.
League President .....	B. B. Patten.
President.....	W. P. Brereton.
Sec.-Treas.....	W. S. H. Keefe.
Manager Seniors.....	M. L. Miller.
“ Juniors .....	C. G. Williams.

## LIST OF SENIOR PLAYERS.

Winners of Faculty Cup.

Brereton, W. P.	Oliver, J. P.
Depew, H. H.	Patten, B. B.
Dowling, F. F.	Rutherford, F. N. (Capt.)
Gibson, A. E.	Small, H. S.
Heron, J. B.	Williams, C. G.
McDonald, L. C.	Whelihan, J. A.
MacInnes, J.	Young, W. H.

## LIST OF JUNIOR PLAYERS.

## Winners of Junior Series.

Cavanagh, T. L.	McAuslan, H. J.
Connor, H. V.	Miller, H. M.
Dillabough, G. A.	Moore, E. E.
Jackson, E. R.	Pace, J. D.
Keefe, W. S. H.	Paterson, G. W.
MacKenzie, W. D.	Williams, C. G.
MacInnes, J.	

## HOCKEY.

The trophy which is competed for annually among the Colleges in Hockey is known as the Jennings Cup, and is the gift of W. T. Jennings, Mem., Inst. C. E., Consulting Engineer, Toronto.

## Hockey Club of the School of Practical Science.

## OFFICERS.

Hon. President .....	Dr. Ellis.
President.....	A. G. Lang.
Vice-President .....	C. L. Coulson.
Sec. and Treas.....	R. H. Montgomery.
Manager Senior Team.....	D. H. Philp.
Manager Junior Team .....	H. M. Fletcher.

## LIST OF PLAYERS.

## SENIOR TEAM.

Barrett, J. H.	Montgomery, R. H.
Harris, C. J.	Nevitt, I. H.
Jackson, E. R.	Pace, G.

## JUNIOR TEAM.

## Winners of Jennings Cup.

Broadfoot, F. C.	Ford, E. A. (Capt.)
Cavanagh, T. L.	Housser, H. B.
Dillabough, G. A.	Montague, F. F.
Evans, H. W.	Pattee, L. F.
Fletcher, W.	Stewart, D. L. N.



## THE TORONTO ENGINEER COMPANY.

Major commanding.....W. R. Lang, Professor of Chemistry  
University of Toronto.

Lieut .....H. W. Evans.  
Lieut .....S. P. Briggs.  
Company Sgt. Major...H. N. Gzowski.  
Sgt. Inst. Military Eng..W. B. Porte.  
Sgt.....W. Elwell.  
Lance Sgt.....A. C. Snively.  
Sgt. Sgt.....H. D. Robertson.  
Lance Sgt. Sgt .....N. A. Burwash.  
Signal.....W. E. Cane.  
Quarter Master Sgt ....A. Williams.

## TRACK CLUB.

President.....J. A. Beatty.  
Vice-Pres.....A. Gray.  
Secy.-Treas.....H. B. Housser.  
IV. Year Rep.....C. M. Teasdale.  
III. " " .....J. H. Smith.  
II. " " .....R. S. Smart.  
I. " " .....F. A. McGiverin.

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## SESSION 1902-1903.

### STUDENTS IN ATTENDANCE.

#### FIRST YEAR.

##### Regular Students.

1	Alport, F.....	Orillia.
3	Armour, R. H.....	Lindsay.
3	Aylsworth, B.....	London.
2	Barber, W.....	Toronto.
5	Bates, H. S.....	Merrickville.
3	Bell, G. G.....	Chesley.
3	Bertram, T. S.....	Dundas.
3	Blaine, T. R.....	Barrie.
3	Bristol, W. M.....	Madoc.
3	Carson, W. R.....	Carsonby.
3	Chantrell, E.....	New Westminster.
3	Charlebois, J. P.....	Toronto.
3	Clement, S. R. A.....	Innisfil, Tp.
5	Coleman, R. M.....	Toronto.
1	Connery, F.....	Toronto.
3	Coone, S. E.....	Manilla.
1	Crane, G. A.....	Toronto.
1	Crosby, N. L.....	Hebron, N. B.
3	Crysdale, C. R.....	Northport.
3	Dillabough, G. A.....	Morrisburg.
3	Dowling, F. F.....	Harriston.
4	Downey, F. C.....	Toronto.
5	Drewry, W. S.....	Winnipeg, Man.
3	Fierheller, H. S.....	Markham.
3	Fletcher, H. M.....	Hamilton.
3	Gordon, J. M.....	Toronto.
1	Greene, W. H.....	Toronto.
3	Harrington, G. E.....	Brantford.
3	Harrison, F. W.....	Hagersville.
1	Hendry, M. C.....	Toronto.
1	Henry, E. A.....	Kincardine.
2	Hertzberg, C. S. L.....	W. Toronto Junction.

FIRST YEAR—*Continued.*

1	Hett, S	Sutton West.
3	Hewson, W. G	Niagara Falls.
1	Holmes, O. B.	Selkirk.
3	Howard, J. A	Springvale.
3	Jepson, W. C.	Niagara Falls.
1	Jones, G. S.	Smith's Falls.
3	Jones, W. C.	Port Hope.
1	Jupp, A. E.	Toronto.
3	Kribs, G	Hespeler.
1	Latornell, A	Meaford.
3	Leighton, J. W.	Toronto
1	MacInnes, J.	Ripley.
3	MacKenzie, W. D.	Kirkfield.
3	MacKinnon, W.	Fenelon Falls.
2	McGiverin, F. A.	Hamilton.
3	McGorman, E. S.	St. Mary's.
1	McGregor, W. W.	Glen Williams.
2	McKenzie, D. W.	Lochash.
3	McLean, C. A.	Frome.
2	McLean, W. N.	Erin, T'p.
3	Maguire, H. C.	St. Catharines.
3	Miller, L. R.	Orillia.
3	Miller, H. M	St. Catharines.
3	Moffatt, R. W.	Bagnor.
1	Montague, F. F.	Hamilton.
1	Moore, W. J	North Gower.
3	Morden, L. W.	Hamilton.
3	Munro, G. R.	Peterboro.
3	Nicklin, W. G.	Sarnia.
3	Paterson, G. W.	Belton.
3	Pattee, L. F.	Trenton.
3	Pettingill, R. E.	Rose Hall.
3	Phillips, H. E.	Winnipeg.
6	Power, C. W.	Toronto.
1	Quick, H. E.	Toronto.
1	Rayner, G. W.	Thorold.
3	Reynolds, G. B.	Toronto.

FIRST YEAR—*Continued.*

3	Richardson, W. L.....	Walkerton.
1	Ross, G. W.....	Burford.
5	Rothwell, T. E.....	Gilford.
2	Scott, G. S.....	Toronto.
3	Simpson, A.....	Galt.
3	Sisson, C E.....	Peterboro.
1	Smith, F. R. S., B.A.....	Ingersoll.
3	Snider, L. E.....	Deseronto.
1	Steele, D. L.....	Meaford.
1	Stevens, W. H.....	Lindsay.
1	Stewart, D. L. N.....	Ottawa.
3	Stubbs, W. F.....	Lakefield.
1	Sturdy, N. H.....	Buffalo, N.Y.
1	Swan, W. G.....	Kincardine.
3	Tate, N. S.....	Cavan, T'p.
3	Thomson, L. R.....	Toronto.
2	Thomson, J. E.....	Toronto.
1	Traill, J. J.....	Toronto.
3	Turner, W. E.....	Orangeville.
3	Uren, A. E.....	Ingersoll.
1	Wagner, H. L.....	Toronto.
1	Wallace, W. W.....	North Gower.
1	Webster, W. G.....	Oakwood.
1	Wheeler, J. S.....	Kirkfield.
3	Wilkie, J. H. N.....	Toronto.
1	Wilson, J. M.....	Toronto.

## Non-Regular Students Taking Full Course.

3	Ainlay, W. L.....	Brussels.
3	Anderson, S. S.....	Windsor.
3	Arens, H. W.....	Orilla.
3	Arnott, G. C.....	Toronto.
3	Baldwin, F. W.....	Toronto.
1	Bevan, W. H. B.....	Niagara Falls.
3	Bird, A. W.....	Putnam.
3	Bourke, E. W.....	Kingston, Jamaica.
3	Brady, W. S.....	Toronto.

FIRST YEAR—*Concluded.*

2	Broadfoot, F. C . . . . .	Seaforth.
3	Cavanagh, T. L. . . . .	Moosomin, Assa.
2	Cochrane, W. C . . . . .	Toronto.
3	Dill, A. W . . . . .	Toronto.
2	Evans, H. W. . . . .	Toronto.
1	Ferguson, G. H. . . . .	Toronto.
2	Fletcher, W. . . . .	St. Catharines.
3	Ford, E. A . . . . .	Belleville.
3	Greene, E. A. . . . .	Orillia.
2	Horwood, H. O. R. . . . .	Toronto.
3	Housser, H. B. . . . .	Toronto.
1	Hughes, E. V. . . . .	Newmarket.
2	Lewis, R. G . . . . .	Balmy Beach.
1	Loudon, T. R. . . . .	Toronto.
3	MacKenzie, K. B. . . . .	Sarnia.
3	McCurdy, J. A. D . . . . .	Toronto.
2	McDonald, L. C. . . . .	Walton.
1	McGregor, J. M. . . . .	Ridgetown.
3	Mace, T. H. . . . .	Toronto.
3	Martin, H. . . . .	Toronto.
2	Merritt, R. N . . . . .	Toronto.
3	Pennington, C. H. . . . .	London.
3	Racey, G. W. . . . .	Comber.
1	Roddick, J. O. . . . .	Brantford.
1	Ross, C . . . . .	Port Robinson.
3	Rundle, L. P . . . . .	Goderich.
3	Ryerson, G. C . . . . .	Toronto.
3	Schell, F. S. . . . .	Brantford.
3	Serson, H. V . . . . .	Antrim.
3	Shirriff, C. H. . . . .	Niagara Falls, S.
3	Sibley, J . . . . .	Toronto.
3	Thompson, H. L. . . . .	Hamilton.
3	Tillson, E. D. . . . .	Tilsonburg.
3	Turner, G. M . . . . .	Victoria, B.C.
3	Vaughan, J. M. . . . .	Toronto.
5	Wickett, W. E. . . . .	Toronto.
2	Wills, P. H. . . . .	Belleville.
2	Wright, G. W . . . . .	Toronto.

## SECOND YEAR.

2	Allen, C. W	Toronto.
3	Barrett, J. H	Port Hope.
1	Beatty, H. E	Toronto.
2	Begg, W. A	West Flamboro.
1	Boeckh, J. C	Toronto.
3	Bonnell, M. B	Bobcaygeon.
3	Brown, T. D	Barrie.
2	Bryce, R. A	Toronto.
3	Burley, R. J	Regina, Assa.
3	Burnham, F. W	Ashburnham
3	Calder, J. W	Cranbrook.
1	Cameron, N. C	Peterboro.
1	Campbell, A. J	Collingwood.
3	Campbell, A. M	Trenton.
1	Chase, A. V	Orillia.
2	Chilver, C. A	Walkerville.
2	Chilver, H. L	Walkerville.
1	Christie, U. W	Chesley.
2	Coates, P. C	Victoria, B. C.
1	Code, S. B	Smith's Falls.
1	Code, T. F	Smith's Falls.
1	Cowan, W. A	Galt.
3	Craig, S. E	Snelgrove.
1	Crerar, S. R	Brussels.
3	Currie, W. M	Port Perry.
3	Depew, H. H	Hamilton.
2	Elder, A. J	Barrie.
2	Fleck, J. G	Ottawa.
1	Ford, A. L	Toronto.
1	Foster, W. J	Windsor.
3	Gibson, Wm. S	Toronto.
1	Goodall, J. N	Bellwood.
3	Gray, A	Port Credit.
3	Gray, W. W	Uxbridge.
3	Greenwood, W. K	Greenwood.
2	Gzowski, H. N	Toronto.
1	Hara, D	Merritton.



SECOND YEAR—*Continued.*

3	Harris, C. J.....	Brantford.
3	Henderson, T. D.....	Acton.
1	Heron, J. B.....	Scarboro Junction.
1	Hill, E. M. M.....	Guelph.
2	Hill, S. N.....	St. Thomas.
2	Ingles, C. J.....	Toronto.
2	Jackson, E. R.....	Seaforth.
1	James, E. A.....	Thornhill.
1	Jermyn, P. V.....	Toronto.
3	Johnston, J. W.....	Toronto.
3	Keefe, W. S. H.....	Iroquois.
1	Kernahan, M. G.....	Toronto.
2	Laing, P. A.....	Dundas.
2	Legge, A. H.....	Jefferson.
3	McCuaig, O. B.....	Toronto.
1	McEwen, G. G.....	Moose Creek.
1	McFarlane, W. G., B. A.....	Claremont.
3	McGibbon, C. P.....	Brampton.
3	McKay, C. D.....	Maplewood.
2	Mackenzie, C. M.....	Galt.
1	McMillan, D.....	Woodville.
3	Manson, G. J.....	St. Catharines.
3	Milne, W. G.....	Brown's Corners.
3	Moore, E. E.....	Peterboro.
1	Moorhouse, W. N.....	Toronto.
2	Morton, P. E.....	Belhaven.
3	Munro, W. H.....	Peterboro.
1	O'Brien, D. E.....	Merrickville.
3	O'Sullivan, J.....	Toronto.
3	Pace, G.....	Orillia.
3	Pardoe, W. S.....	Toronto.
3	Paris, J.....	White Lake.
2	Parke, J.....	Oil City.
3	Peaker, W. J.....	Brampton.
1	Phillips, E. P. A.....	Cedarville.
3	Pickering, A. E.....	Brampton.
1	Porte, W. B.....	Toronto.

SECOND YEAR—*Concluded.*

2	Ramsey, G. L.....	Dunnville.
1	Raymond, D. L. C.....	Windsor.
1	Reid, F. B.....	Bowmanville.
3	Riddell, M. R.....	Toronto.
1	Robinson, L.....	Brockville.
3	Roxburgh, G. S.....	Norwood.
2	Rutherford, F. N.....	South Monaghan.
3	Sauder, P. M.....	Galt.
1	Sheply, J. D.....	Leamington.
3	Slater, F. W.....	London.
3	Smart, R. S.....	Toronto.
1	Smith, D. A.....	Claude.
3	Smither, W. J.....	Toronto.
1	Southworth, H. S.....	Toronto.
2	Street, P. B.....	Toronto.
1	Tait, B. J.....	Peterboro.
2	Thompson, H. P.....	Toronto.
3	Thomson, S. E.....	Blenheim.
3	Townsend, C. J.....	Toronto.
1	Townsend, D. T.....	Woodstock.
1	Trimble, A. V.....	Toronto.
3	Tucker, B. B.....	Allanburg.
2	Wade, E.....	Welland.
1	Walker, E. W... ..	Cayuga
3	Watson, J. P.....	Acacia.
1	Weddell, R. G.....	Trenton.
1	Weir, J. M.....	Toronto.
1	Wells, A. F.....	Sandwich.
1	Worthington, W. R.....	Toronto.
3	Wright, W. F.....	Toronto.
3	Yeates, P. M.....	London.
2	Young, W. H.....	Clifford.

## THIRD YEAR.

3	Acres, H. G.....	Paris.
1	Alison, J. G. R.....	Toronto.
3	Angus, H. H.....	London.

THIRD YEAR—*Continued.*

3	Beatty, J. A.	Fergus.
3	Breslove, J.	Toronto.
2	Burd, J. H.	Parry Sound.
1	Burgess, E. L.	Burgessville.
2	Burwash, N. A.	Toronto.
4	Challies, J. B.	Winchester.
1	Clarke, F. F.	Deer Park.
3	Coulson, C. L.	Welland.
3	Davison, A. E.	Prescott.
3	Fensom, C. J.	Toronto.
2	Fuce, E. O.	Toronto.
3	Gaby, F. A.	Toronto.
3	George, R. E.	Port Elgin.
1	Gardner, J. C.	Niagara Falls.
1	Gillespie, P.	Cobourg.
1	Gordon, J. P.	Toronto.
1	Gourlay, W. A.	Toronto.
2	Hamilton, J. F.	Dunedin.
2	Hanes, G. S.	Windsor.
5	Horton, J. A.	Hurondale.
2	Harcourt, F. Y., B.A.	Toronto.
1	Hayes, L. J.	Toronto.
1	Henderson, F. D.	Crathie.
3	Jackson, J. G.	London.
3	Johnston, C. K.	Pefferlaw.
1	Johnston, H.	Meaford.
3	Lang, A. G.	Toronto.
3	Larkworthy, W. J.	Mitchell.
1	Latornell, A. J.	Meaford.
1	McAuslan, H. J.	Heathcote.
3	McFarlane, J. A.	Donegal.
1	McNaughton, A. L.	Cornwall.
5	Marriott, F. G.	Toronto.
3	Maus, C. A.	Paris.
3	Miller, M. L.	Alymer.
3	Mitchell, P. H.	Waterloo.
2	Montgomery, R. H.	Brantford.
1	Moore, F. A.	Toronto.

THIRD YEAR—*Concluded.*

1	Morley, R. W.	Toronto.
3	Mullins, E. E.	Toronto.
3	Nevitt, I. H.	Toronto.
1	Oliver, E. W.	Toronto.
3	Oliver, J. P.	Eberts.
3	Pace, J. D.	Orillia.
3	Patten, B. B.	St. George.
2	Philp, D. H.	Petrolea
3	Pinkney, D. H.	Morrison.
2	Plunkett, T. H.	Meaford.
1	Robertson, D. F.	Almonte.
1	Seymour, H. L.	Toronto.
3	Shipe, H. M.	Toronto.
3	Small, H. S.	Toronto.
1	Smith, J. H.	New Hamburg.
3	Smith, H. G.	St. Catharines.
3	Trees, S. L.	Toronto.
2	Umbach, J. E.	Elmira.
1	Waldron, J.	Pine Grove.
3	Wass, S. B.	Granton.
3	Whelihan, J. A.	St. Mary's
3	White, H. F.	London.
2	Williams, C. G.	London.
1	Wilson, N. D.	Toronto.
1	Young, C. R.	Picton.

## FOURTH YEAR.

	Blair, W. J.	Embro.
	Brereton, W. P.	Bethany.
	Chace, W. G.	St. Catharines.
	Chadsey, S. B.	Wellington.
	Christie, W.	Chesley.
	Connor, H. V.	Sarginson.
	Culbert, M. T.	London.
	Elwell, W.	Toronto.
	Empey, J. M.	Thamesford.
	Forbes, D. L. H.	Toronto.

FOURTH YEAR—*Continued.*

Gagné, S.....	St. Joseph d'Alma, P.Q.
Gibson, A. E.....	Ingersoll.
Knight, R. H.....	Bruce Mines.
Langmuir, F. L.....	Toronto.
Madden, J. F. S.....	Toronto.
Mathison, P.....	Union.
Powell, G. G.....	Toronto.
Robertson, H. D.....	Walkerton.
Sinclair, D.....	Cheltenham.
Sutherland, W. H. ....	Toronto.
Teasdale, C. M.....	Concord.
Zahn, H.....	Toronto.

## OCCASIONAL STUDENTS.

Burton, E. F., B.A .....	Toronto.
Burwash, E. M. ....	Toronto.
McLennan, W. S.....	Buffalo, N.Y.
Wing, J. G.....	Hamilton.

## PRIZEMEN.

## Engineering.

1879.— I. Year.....	J. McAREE.....	1st prize.
1880.—II. “ .....	J. L. MORRIS.....	1st “
1881.— I. “ . . .	G. H. DUGGAN.....	1st “
II. “ .....	D. JEFFREY .....	1st “
1882.— I. “ .....	A. R. RAYMER.....	1st “
I. “ .....	E. W. STERN .....	2nd “
II. “ .....	G. H. DUGGAN.....	1st “
III. “ .....	D JEFFREY.....	1st “
1883.— I. “ .....	B. A. LUDGATE.....	1st “
I. “ .....	A. M. BOWMAN.....	2nd “
II. “ .....	A. P. RAYMER.....	1st “
II. “ .....	E. W. STERN.....	2nd “
III. “ .....	G. H. DUGGAN.....	1st “
1884.—II. “ .....	B. A. LUDGATE.....	1st “
III. “ .....	E. W. STERN .....	1st “
III. “ .....	A. R. RAYMER .....	2nd “

PRIZEMEN—*Continued.*

1885.—	I.	Year.....	A. E. LOTT.....	1st prize.
	I.	"	J. ROGERS .....	2nd "
	II.	"	T. K. THOMSON .....	1st "
	III.	"	B. A. LUDGATE.....	1st "
1886.—	I.	"	C. H. C. WRIGHT .....	1st "
	I.	"	J. E. ROSS.....	2nd "
	II.	"	A. E. LOTT.....	1st "
1887.—	I.	"	H. E. T. HAULTAIN.....	1st "
	II.	"	C. H. C. WRIGHT .....	1st "
	III.	"	A. E. LOTT.....	1st "
	III.	"	J. ROGERS .....	2nd "
1888.—	I.	Year.....	E. B. MERRILL .....	1st "
	I.	"	F. M. BOWMAN.....	2nd "
	II.	"	D. D. JAMES.....	1st "
	III.	"	C. H. C. WRIGHT.....	1st "
1889.—	I.	"	J. K. ROBINSON.....	1st "
	I.	"	G. E. SILVESTER.....	2nd "
	II.	"	E. B. MERRILL.....	1st "
	II.	"	F. M. BOWMAN.....	2nd "
	III.	"	D. D. JAMES.....	1st "
1890.—	I.	"	C. FAIRCHILD .....	1st "
	II.	"	J. K. ROBINSON.....	1st "
	III.	"	F. M. BOWMAN.....	1st "
	III.	"	E. B. MERRILL.....	2nd "
1891.—	I.	"	A. J. MCPHERSON.....	1st "
	I.	"	R. B. WATSON.....	2nd "
	II.	"	J. B. GOODWIN .....	1st "
	III.	"	G. E. SILVESTER.....	1st "
	III.	"	C. W. DILL.....	2nd "
1892.—	I.	"	A. E. BERGEY.....	1st "
	I.	"	R. W. ANGUS .....	2nd "
	II.	"	A. J. MCPHERSON.....	1st "
	II.	"	R. B. WATSON.....	2nd "
	III.	"	E. J. LASCHINGER.....	1st "
	III.	"	C. FAIRCHILD.....	2nd "

The grant for prizes was withdrawn at the close of 1892.



**Architecture.**

The prize in Architecture was the gift of Mr. D. B. Dick, Architect, Toronto.

- 1891.—I. Year.....H. F. BALLANTYNE.  
 1892.—I. “ .....J. A. EWART.  
 1893.—I. “ .....A. H. HARKNESS.  
 1894.—I. “ .....E. A. FORWARD.  
 1895.—I. “ .....W. F. SCOTT.  
 1896.—I. “ .....D. MACKINTOSH.  
 1899.—I. “ .....W. F. SHEPHERD.

**Civil Engineering.**

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C.E., New York.

- 1897.—III, Year.....M. B. WEEKES.  
 1898.—III. “ .....J. A. STEWART.  
 1899.—III. “ .. ...T. SHANKS.  
 1900.—III “ .....E. H. PHILLIPS  
 1901.—III. “ .....H. P. RUST.  
 1902.—III. “ .....W. F. RATZ.

**Mechanical and Electrical Engineering.**

Donor, Mr. F. A. Riehle, Philadelphia.

- 1997.—III. Year.....A. T. GRAY.  
 1898.—III. “ .....F. C. SMALLPEICE.

**UNIVERSITY OF TORONTO.****Degree of Bachelor of Applied Science (B.A. Sc.**

Date of admission.	Name.	Date of admission.	Name.
1893..	Alison, T. H.	1902 *	Boswell, M. C.
1987 *	Angus, R. W.	1899..	Boyd, W. H.
1901..	Ardagh, E. G. R.	1902..	Brandon, E. T.
1896..	Armstrong, J.	1896..	Brodie, W. M.
1897 *	Bain, J. W.	1895..	Bucke, W. A.
1894 *	Ballantyne, H. F.	1900..	Burnside, J. T. M.
1901..	Barley, J. H.	1898..	Carpenter, H. S.
1902..	Barrett, R. H.	1899..	Carter, W. E. H.
1895..	Beauregard, A. T.	1898..	Charlton, H. W.

\* Degree with honors.

DEGREE OF BACHELOR OF APPLIED SCIENCE.—*Continued.*

Date of admission.	Name.	Date of admission.	Name.
1894.	*Chewett, H. J.	1893	*Laschinger, E. J.
1900	*Chubbuck, L. B.	1901..	Latham, R.
1902..	Cockburn, J. R.	1893	*Lawson, W.
1900..	Coulthard, R. W.	1893	Lea, W. A.
1901..	Craig, J. A.	1894..	McAllister, A. L.
1901..	Davison, J. E.	1895..	McAllister, J. E.
1902..	DeCew, J. A.	1893..	McAree, J.
1901..	Dickson, G. W.	1897..	Macallum, A. F.
1901	*Dixon, H. A.	1893..	McEntee, B.
1896..	Dobie, J. S.	1896	*McGowan, J.
1902	*Eason, D. E.	1896.	*McKinnon, H. L.
1897	*Elliott, H. P.	1901..	McMillan, J. G.
1895	*Ewart, J. A.	1894.	*McPherson, A. J.
1901..	Foreman, W. E.	1895..	McTaggart, A. L.
1894	*Goodwin, J. B.	1902	*McVean, H. G.
1899..	Grant, W. F.	1897..	Macbeth, C. W.
1898..	Gray, A. T.	1897..	Martin, T.
1901..	Guy, E.	1894	*Merrill, E. B.
1897	*Haight, H. V.	1893..	Milne, C. G.
1900..	Hare, W. A.	1896..	Mines, W. H.
1897	*Harkness, A. H.	1895	*Minty, W.
1902..	Harvey, C.	1894..	Mitchell, C. H.
1901..	Hemphill, W.	1900..	Monds, W.
1895..	Herald, W. J.	1901..	Neelands, E. V.
1901	Holcroft, H. S.	1901..	Pope, A. S. H.
1896..	Hull, H. S.	1902	*Price, H. W.
1894..	James, D. D.	1900.	*Revell, G. E.
1893..	James, O. S.	1900..	Richards, E.
1895.	*Job, H. E.	1901..	Roaf, J. R.
1895..	Johnson, S. M.	1898.	*Robinson, A. H. A.
1902..	Johnson, J. A.	1902..	Rust, H. P.
1896..	Johnson, A. C.	1901..	Saunders, H. W.
1894	*Keele, J.	1902..	Sauer, M. V.
1899..	Korman, J. S.	1900	*Shanks, T.
1894..	Laidlaw, J. T.	1895..	Shields, J. D.
1893..	Laing, A. T.	1899..	Shiple, A. E.

\* Degree with honors.

DEGREE OF BACHELOR OF APPLIED SCIENCE—*Concluded.*

Date of admission.	Name.	Date of admission.	Name.
1902	*Smallpeice, F. C.	1901..	Thorne, S. M.
1898..	Smiley, R. W.	1901..	Thorold, F. W.
1894	*Speller, F. N.	1896..	Tremaine, R. C. C.
1894...	Squire, R. H.	1900..	Wagner, W. E.
1902..	Stevenson, W. H.	1898..	Weekes, M. B.
1898.	*Stull, W. W.	1901...	Weir, H. M.
1900.	*Tennant, D. C.	1899.	*Williamson, D. A.
1901..	Tennant, W. C.	1893.	*Wright, C. H. C.
1893..	Thomson, R. W.	1902..	Wright, R. T.

*Degree of Civil Engineer (C.E.).*

1899..	Alison, T. H.	1886..	Kennedy, J. H.
1898..	Ashbridge, W. T.	1895..	McAllister, J. E.
1895..	Bowman, A. M.	1901..	McDowall, R.
1893..	Bowman, F. M.	1898..	Mitchell, C. H.
1892..	Chewett, H. J.	1896..	Moore, J. E. A.
1900..	Connor, A. W.	1885..	Morris, J. L.
1901..	Francis, W. J.	1892..	Thomson, T. K.
1900..	Haultain, H. E. T.	1894..	Tyrrell, H. G.
1893..	Innes, W. L.	1889..	Tyrell, J. W.

*Degree of Mining Engineer (M.E.).*

Date of admission.	Name.
1897.....	Bucke, M. A.
1900.....	Laidlaw, J. T.

*Degree of Mechanical Engineer (M.E.).*

Date of admission.	Name.
1900.....	White, A. V.
1901.....	Johnston, A. C.

*Degree of Electrical Engineer (E.E.).*

Date of admission.	Name.
1896.....	Ross, R. A.
1902.....	Elliott, H. P.

\* Degree with honors.



## GRADUATES.

NOTE.—Graduates are requested to inform the Registrar of changes in their addresses.

### 1881

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1	J. L. MORRIS, C.E., O.L.S..... Pembroke, Ont.	Engineer and Surveyor.

### 1882

1.	D. JEFFREY .....	Contractor. Delmar, Iowa.
1.	J. H. KENNEDY, C.E., O.L.S.....	Chief Engineer Vancouver, Victoria Vancouver, B.C. & Eastern Ry.
1.	J. McAREE, B.A.Sc., D.T.S.....	Dominion Land Surveys, N.W.T. Ottawa, Ont.

### 1883

1.	D. BURNS, O.L.S. ....	West Side Belt R. R., A.M. Can. Soc. C.E., Pittsburgh, Pa.	Pittsburg Bank for Savings Build- ing.
1.	G. H. DUGGAN, M. Can. Soc. C.E.	Chief Engineer, Dominion Iron & Sydney, N.S.	Steel Co.
1.	J. W. TYRRELL, C.E., D.L.S.....	Consulting Engineer and Surveyor. Hamilton, Ont.	

### 1884

1.	W. C. KIRKLAND .....	Chief Engineer Drainage Commis- New Orleans, La.	sion of New Orleans.
1.	J. McDUGGALL, B.A.....	York County Engineer. A.M. Inst. C.E., Court House, Toronto, Ont.	
1.	A. R. RAYMER, .....	Asst. Chief Engineer, P. & L. E. Pittsburgh, Pa.	Ry.
1.	JAMES ROBERTSON, O.L.S.....	Engineer and Surveyor. Glencoe, Ont.	
1.	E. W. STERN .....	Consulting Engineer, Steel Struc- M. Am. Soc. C.E.	tures, Buildings, etc. 1133 Broadway, New York.

### 1885

1.	F. W. BLEAKELY .....	Civil Engineer. Sullivan Block, Seattle, W.T.	
1.	H. J. BOWMAN, D. & O.L.S.....	Consulting Engineer. M. Can. Soc. C.E., Berlin, Ont.	(County Clerk and Treasurer.)
1.	E. E. HENDERSON, O.L.S., .....	Civil Engineer. Henderson, P.O., Me.	
1.	B. A. LUDGATE, O.L.S.....	Asst Engineer, P. & L. E. Ry. Pittsburgh, Pa.	
1.	O. McKAY, O.L.S.....	Chief Engineer, Lake Erie and De- Walkerville, Ont.	troit River Ry.

## 1886

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	A. M. BOWMAN, D.L.S.....	Engineer, Evansville Contract Co. Pittsburgh, Pa.
1.	E. B. HERMON, D. & O.L.S.....	Garden, Hermon & Burwell, Vancouver, B.C.                      Engineers and Surveyors.
1.	ROBERT LAIRD, O.L.S.....	Engineer on Construction, North Bay, Ont.                      Temiskaming Ry.
1.	T. KENNARD THOMSON, C.E.....	Consulting Engineer. M. Am. Soc. C.E., 13-21 Park Row, New York.
1.	H. G. TYRRELL, C.E.....	Consulting Engineer. A.M. Can. Soc. C.E. 1429 Cedar Ave. Cleveland, O.

## 1887

1. J. C. BURNS (deceased.)
1. A. E. LOTT. .... Consulting Railway Engineer.  
Mexico, Mexico.
1. A. L. McCULLOCH, O.L.S..... City Engineer.  
A.M. Can Soc. C. E.  
Nelson, B.C.
1. F. MARTIN, M.B. O.L.S..... Physician.
1. C. H. PINHEY, D. & O.L.S..... Engineer for contractor, Soulanges  
Coteau Landing.                      Canal.
1. J. ROGERS, O.L.S..... Town Engineer.  
Mitchell, Ont.

## 1888

1. J. F. APSEY, O. L. S..... With James River Construction Co.  
115 East Franklin St.,  
Richmond, Va.
1. W. T. ASHBRIDGE..... Town Engineer, Lindsay, Ont.  
Temple Building, Toronto,  
Ont.
1. EDWARD F. BALL..... Civil Engineer.  
A.M. Can. Soc. C.E., Room  
400, Grand Central Station,  
New York, N.Y.
1. D. B. BROWN, O.L.S..... Civil Engineer.  
Cuidad de Guatemala,  
Guatemala.
1. C. M. CANNIFF..... Engineer, Expanded Metal and  
Toronto.                      Fireproofing Co.
1. H. J. CHEWITT, C.E., B.A.Sc.,... Mining Engineer.  
A.M. Can. Soc. C.E.  
83½ York St., Toronto, Ont.



## 1888—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	J. GIBBONS, D. & O.L.S.....	Surveying Staff, Dep't of Interior. Ottawa, Ont.
1.	R. McDOWALL, O.L.S., C.E.....	Town Engineer. A.M. Can. Soc. C.E. Owen Sound, Ont.
1.	G. W. McFARLEN, O.L.S.....	City Engineer's Staff. Toronto, Ont.
	. MARANI.....	Manager, Canada Permanent and P.O. Box 245, Western Canada Mortgage Cor- Vancouver, B.C. poration.
1.	G. R. MICKLE, B. A.....	Lecturer in Mining Engineering Toronto, Ont. School of Practical Science.
1.	J. H. MOORE, O.L.S..	Town Engineer. Smith's Falls, Ont.
1.	G. H. RICHARDSON.....	Assist City Engineer. Ottawa, Ont.
1.	K. ROSE.....	Civil and Mining Engineer. 62 William St., New York.
1.	J. E. ROSS, D. & O.L.S.....	Surveying Staff, Dept. of Interior. Kamloops, B.C.
1.	C. H. C. WRIGHT, B.A.Sc.....	Professor of Architecture, Toronto, Ont. School of Practical Science.

## 1889

1.	B. CAREY, Toronto, Ont.	
1.	W. J. CHALMERS.....	Draftsman, Riter-Conley Mfg. Co. Pittsburgh, Pa.
1.	W. A. CLEMENT.....	Sewer Engineer, Staff of City A. M. Can. Soc. C.E., Engineer. Toronto, Ont.
1.	G. F. HANNING.....	Engineering Staff, Ont. & Rainy Port Arthur, Ont. River Ry.
1.	H. E. T. HAULTAIN, C.E.....	Mining Engineer. M. Can. Soc. C.E. Nelson, B.C.
1.	J. IRVINE.....	Civil Engineer. Harriston, Ont.
1.	D. D. JAMES, B.A.....	Engineering Staff, Algoma Commercial Co. B. A. Sc. O.L.S. Sault Ste. Marie, Ont.
1.	F. X. MILL (deceased).	
1.	H. K. MOBERLY .....	With Quebec Fire Assurance Co. Innisfail, Alberta.

## 1889—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	T. R. ROSEBRUGH, M.A. . . . .	Professor in Electrical Engineering Toronto, Ont. School of Practical Science.
1.	T. WICKETT, M.D. . . . .	Physician. Watford, Ont.

## 1890.

5. W. E. BOUSTEAD (deceased).
1. F. M. BOWMAN, O.L.S., C.E. . . . . Structural Engineer,  
Pittsburgh, Pa. Riter-Conley Mfg. Co.
1. M. A. BUCKE, M. E. (deceased).
1. G. D. CORRIGAN (deceased).
1. J. A. DUFF, B.A. (deceased).
1. A. B. ENGLISH (deceased).
1. N. L. Garland. . . . . Garland Manufacturing Co.  
76 Bay St., Toronto, Ont.
1. J. HUTCHEON, O.L.S. . . . . City Engineer.  
Guelph, Ont.
1. W. L. INNIS, O.L.S., C. E. . . . . Manager, Simcoe Canning Co.  
Simcoe, Ont.
1. E. B. MERRIL, B. A., B.A.Sc. . . . Mechanical Engineering Dept.,  
Pittsburgh, Pa. Westinghouse Electric & Mfg. Co.
1. J. R. PEDDER (deceased).
3. R. A. ROSS, E.E. . . . . Consulting, Electrical and Mechanical  
17 St. John St. Engineer.  
Montreal, P.O.
1. T. H. WIGGINS, O.L.S. . . . . Drainage Engineer.  
Finch, Ont.
1. W. J. WITHROW . . . . . Patent Examiner, Patent Branch,  
Ottawa, Ont. Dept. of Agriculture.

## 1891.

1. H. J. BEATTY, O.L.S. . . . . Engineer & Surveyor.  
Eganville, Ont.
1. T. R. DEACON, O.L.S. . . . . Managing Director,  
Rat Portage, Ont. Mikado Gold Mining Co.
1. C. W. DILL. . . . . Roadways Engineer,  
Toronto, Ont. Staff of City Engineer.
5. O. S. JAMES, B.A. Sc . . . . . Analytical Chemist and Assayer, 227  
Toronto, Ont. George St.
1. A. LANE. . . . . Civil Engineer.  
Angus New Mexico
1. J. E. McALLISTER, C.E., B.A.Sc. . . Smelting Supt., British Columbia  
Greenwood, B. C. Copper Smelting Works.

## 1891.—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	E. B. MERRILL, B.A., B.A. Sc., Pittsburgh, Pa.	Mechanical Engineering Dept., Westinghouse Electric Mfg. Co.
1.	J. E. A. MOORE, C.E.....	Estimating Engineer, Wellman- Cleveland, O. Seaver & Morgan Engineering Co.
1.	W. NEWMAN, O.L.S.....	City Engineer. A. M. Can. Soc. C.E. Windsor, Ont.
1.	J. K. ROBINSON (deceased).	
1.	W. B. RUSSEL .....	Chief Engineer, North Bay, Ont. Temiskaming & Northern Ry.
1.	G. E. SILVESTER, O.L.S.....	DeMorest & Silvester, Civil and Sudbury, Ont. Mining Engineers.
1.	H. D. SYMMES.....	Contractor's Engineer, Niagara Falls, Ont. Ontario Power Co.

## 1892,

1.	J. R. ALLAN, O.L.S. ....	Ranchman. Macleod, Alta.
1.	T. H. ALISON, B.A. Sc., C.E.....	Chief Engineer, Augustes Smith 39-41 Cortland St., New York. Co.
1.	A. G. ANDERSON, Port Dover, Ont.	
1.	C. FAIRCHILD, D. & O.L.S... ..	Surveying Staff, Dept. of Interior. Ottawa, Ont.
1.	J. B. GOODWIN, B.A.Sc.....	Asst. Engineer Niagara Falls Niagara Falls, N.Y. Power Co.
4.	C. E. LANGLEY .....	Langley & Langley, Architects. Can Life Bldg., Toronto, Ont.
1.	A. T. LAING, B.A.Sc. ....	Registrar, Toronto, Ont. School of Practical Science.
1.	E. J. LASCHINGER, B.A.Sc.....	Asst. Engineer, Consolidated Gold Johannesburg. Fields of South Africa. Transvaal, S.A.
5.	W. LAWSON, B.A.Sc. ....	Chief Chemist and Asst. Manager Alvarado, Cal. Alameda Sugar Co.
3.	W. A. LEA, B.A.Sc.....	Mechanical Engineer, Mexico, Mexico. Mexico Street Ry.
1.	B. McENTEE, B.A.Sc., 28 Queen St. E., Toronto, Ont.	
3.	C. G. MILNE, B.A.Sc.....	Chief Engineer, Hamilton Bridge Hamilton, Ont. Works Co.
1.	CHAS. H. MITCHELL, B.A.Sc....	Hydraulic Engineer, C.E., M.Can.Soc.C.E., Ontario Power Co. Niagara Falls, Ont.

## 1892—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	N. L. PLAYFAIR.....	Superintendent, Playfair Lumber Midland, Ont. Co.
1.	J. M. PRENTICE (deceased).	
1.	J. A. ROSS .....	Chief Draftsman L. S. & M. S. Ry. Cleveland, O.
1.	ALBERT N. SMITH .....	Superintending representative of 330 Main St. Pittsburg, Pa. Julian Kennedy, Consulting Engineer.
1.	R. W. THOMSON, B.A.Sc.....	Consulting Mining Engineer. Johannesburg, Transvaal, S.A.
3.	A. V. WHITE, M.E.	Toronto, Ont.

## 1893.

1.	J. A. ARDAGH. ....	Staff of Division Engineer, C.P.R. Toronto, Ont.
4.	*H. F. BALLANTYNE, B.A.Sc....	Firm of Ballantyne & Evans, Archi- New York. tects and Engineers, 20 Nassau St.
1.	G. L. BROWN, O.L.S. ....	County Engineer, Dundas, Stormont Morrisburgh, Ont. and Glengarry.
1.	*L. C. CHARLESWORTH.....	Dominion Land Office. Regina, Sask.
1.	T. H. DUNN .....	Firm of Dunn & Fullerton, Civil Winchester, Ont. Engineers.
1.	J. M. R. FAIRBAIRN, O. L. S.....	Resident Engineer, C.P.R. Ottawa, Ont.
4.	*W. FINGLAND.....	Architect. 39 Caryl Ave., Yonkers N.Y.
1.	C. FORESTER,	Toronto, Ont.
1.	*W. J. FRANCIS, C. E. ...	Engineer of Hydraulic Lift Locks, M. Can. Society, C.E., Trent Canal. Peterboro, Ont.
3.	*A. R. GOLDIE.....	Manager, Goldie & McCulloch En- Galt, Ont. gine Works.
3.	S. C. HANLY .....	Mechanical Engineer. Midland, Ont.
4.	*J. KEELE, B.A. Sc.....	Geological Survey. Ottawa, Ont.
1.	J. T. LAIDLAW, B.A.Sc., M.E.....	Consulting Mining Engineer. Fort Steele, B.C.

\* Diploma with honors.

## 1893—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	F. L. LASH.....	Manager, Batavia Electric Light Batavia, Java. Co.
1.	A. L. McALLISTER, B. A. Sc.....	Draftsman, Trenton, N.J. American Steel Corporation.
1.	T. J. McFARLEN .....	Chief Chemist, Nova Scotia Steel Ferrona, N.S. Co.
1.	*A. J. McPHERSON, B.A. Sc. ....	Mining Engineer & Surveyor. D.L.S., Dawson, Yukon Terr.
1.	A. F. McCALLUM, B.A.Sc .....	Lecturer, Toronto Technical School Toronto, Ont.
1.	W. T. MAIN.....	Civil Engineer. Brampton, Ont.
1.	V. G. MARANI .....	Assistant Engineer Cleveland Gas, Cleveland, Ohio. Light and Coke Co.
1.	W. MINES, B.A., Sc.....	With Brown Hoisting Co. Cleveland, Ohio.
	*J. M. ROBERTSON .....	Superintendent, Motor and Repair Montreal, P.Q. Dept., Montreal Light, Heat and Power Co.
1.	R. RUSSEL.....	Asst. Chief Engineer Temiskaming North Bay, Ont. Railway.
1.	*F. N. SPELLER, B. A. Sc.....	Chemist, National Tube Works Co. McKeesport, Pa.
1.	R. H. SQUIRE, B.A. Sc., O.L.S .....	Engineer, Ontario Portland Cement Brant Chambers, Co. Brantford, Ont.
1.	W. V. TAYLOR, O.L.S.....	Engineering Staff, Locomotive and A.M., Can. Soc. C.E. Machine Co. Ltd. Montreal, P.Q.
1.	*R. B. WATSON .....	Mining Engineer. Dawson, Yukon Terr.

## 1894

3.	*R. W. ANGUS, B.A. Sc .....	Lecturer in Mechanical Engineer- Toronto, Ont. ing, School of Practical Science.
1.	H. F. BARKER .....	With Office Specialty Mfg. Co. Toronto.
1.	A. T. BEAUREGARD, B.A. Sc.....	With United Gas Improvement Co. Philadelphia, Pa.
1.	A. E. BERGEY....	With American Bridge Co., Key- Pittsburgh, Pa. stone Branch.

\* Diploma with honors.

## 1894—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	D. G. BOYD.....	Inspector of Mines. Michipicoten, Ont.
3.	W. A. BUCKE.....	With Canadian General Electric Toronto, Ont. Co.
1.	J. CHALMERS, O.L.S.....	Asst. Engineer, Canadian Northern A.M. Can Soc. C. E., Ry. Winnipeg, Man.
4.	*J. A. EWART, B.A.Sc. ....	Arnoldi & Ewart, Architects. Ottawa, Ont.
3.	W. J. HERALD, B.A.Sc. ....	With Dominion Iron and Steel Co. Sydney, N.S.
3.	H. E. JOB, B.A.Sc.....	Manager, Toronto & Hamilton Hamilton, Ont. Electric Co.
3.	A. C. JOHNSTON, B.A. Sc., M.E....	Consulting Mechanical Engineer. Bristol, Pa.
1.	S. M. JOHNSTON, B.A. Sc., P.L.S...	City Engineer. Greenwood, B.C.
1.	J. E. JONES.....	Manager, M. H. Treadwell & Co., Pittsburgh, Pa. Engineers, Founders and Ma- chinists.
3.	N. M. LASH.....	Asst. Electrical Engineer, Bell Montreal, P.Q. Telephone Co.
1.	*A. L. McTAGGART, B.A.Sc.....	Draftsman, National Tube Works McKeesport, Pa. Co.
3.	*W. MINTY, B.A.Sc.....	Consulting Engineering Dept., Na- Manchester, Eng. tional Boiler & General Insurance Co.
3.	C. J. NICHOLSON, Preston, Ont.	
1.	H. ROLPH.....	Mining Engineer. Dawson City, Yukon Ter.
1.	J. D. SHIELDS, B.A.Sc .....	Staff of City Engineer. Toronto, Ont.
3.	A. K. SPOTTON .....	With Goldie & McCulloch Galt, Ont. Engine Works.
1.	ANGUS SMITH, O.L.S.....	City Engineer. Stratford, Ont.
3.	R. T. WRIGHT, B.A.Sc.....	Draftsman, Westinghouse Machine Pittsburgh, Pa. Co.

## 1895

1.	J. ARMSTRONG, B.A.Sc .....	Locating Engineer Can. Northern Edmonton, N.W.T. Railway Co.
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\* Diploma with honors.



## 1895—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	A. E. BLACKWOOD.....	Manager, New York Office, 71 Broadway, New York. Sullivan Machinery Co.
1.	E. J. BOSWELL, D.L.S.....	Asst. Engineer C.P.R. Winnipeg, Man.
3.	G. BREBNER.....	With General Electric Co. Schenectady, N.Y.
3.	W. M. BRODIE, B.A.Sc.....	With the Green Engineering Co. of Pittsburgh, Pa. Chicago.
3.	L. L. BROWN.....	Supt. Foundation and Contracting New York, N.Y. Co., 35 Nassau St.
4.	R. J. CAMPBELL.....	Artist, Chicago Tribune. Chicago, Ill.
3.	A. W. CONNOR, B.A., C.E.....	Engineering Department, Canada Toronto, Ont. Foundry Co.
1.	J. S. DOBIE, B.A. Sc.....	Mining Engineer. Bruce Mines, Ont.
1.	F. W. GUERNESY.....	Engineer, White Bear Mining Co, Rossland, B.C.
4.	*A. H. HARKNESS, B.A.Sc.....	Engineering Dept. Canada Foundry Toronto, Ont, Co.
3.	H. S. HULL, B.A., Sc.....	With Vulcan Iron Works. Wilkes Barre, Pa.
3.	*J. MCGOWAN, B.A., B.A.Sc., ...	Lecturer in Applied Mechanics, Toronto, Ont. School of Practical Science.
3.	W. N. MCKAY.....	With Bank of Hamilton. Hamilton, Ont.
3.	H. L. MCKINNON, B.A.Sc.....	With the Brown Hoisting Machine Cleveland, O. Co.
1.	W. W. MEADOWS, O.L.S.....	Engineering Staff L.E. & D.R. Ry. Walkerville, Ont.
1.	F. J. ROBINSON, D. & O.L.S.....	District Engineer, Southern Alberta. Macleod, Alta.
3.	F. T. STOCKING.....	With Pike's Peak Power Co. Victor, Col.
3.	R. C. C. TREMAINE, B.A.Sc.....	(Deceased.)

## 1896

2.	*J. W. BAIN, B.A.Sc.....	Lecturer in Applied Chemistry, Toronto, Ont. School of Practical Science.
2.	L. T. BURWASH.....	Mining Recorder, Timber and Stewart River P.O., Yukon Crown Lands Agent.

\* Diploma with honors.

## 1896—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	*G. M. CAMPBELL..... Pittsburgh, Pa.	Electrical Engineer, P. & L. E. Ry. Co.
2.	J. A. DECEW, B.A.Sc..... Windsor Mills, P.Q.	Chemist, Canada Paper Co.
3.	*H. P. ELLIOTT, B.A.Sc., M.E.... Pittsburgh, Pa.	Electrical Engineer, Westinghouse Electric and Mfg. Co.
3.	W. C. GURNEY..... Toronto Ont.	Vice-President Gurney Foundry Co.
3.	*H. V. HAIGHT, B.A.Sc..... Sherbrooke, P.Q.	Engineer, Canadian Rand Drill Co.
1.	W. F. LAING..... Sault Ste. Marie, Ont.	Engineer on construction, Algoma Central Ry. Co.
3.	R. R. LAWRIE (deceased).	
3.	C. MACBETH, B.A.Sc. .... Detroit, Mich.	Engineering Staff, Michigan Central Railroad.
3.	J. A. MCMURCHY..... Pittsburgh, Pa.	With Westinghouse Machine Co.
1.	T. MARTIN, B.A.Sc..... Port Arthur, Ont.	Engineering Staff, Ontario Rainy River Ry.
3.	R. R. SHIPE..... Toronto, Ont.	With Toronto Engraving Co.

## 1897

2.	E. ANDREWES, B.Sc..... Blaenau, Festiniog, N.Wales.	Res. Engineer, Main Offeren Slate Quarry Co.
2.	*J. A. BOW..... Butte, Mon.	Mining Engineer.
1.	H. S. CARPENTER..... B.A.Sc., O.L.S., Peterboro, Ont.	Asst. Engineer, Trent Valley Canal.
5.	H. W. CHARLTON, B.A. Sc..... Ottawa, Ont.	Assistant Analyst at Experimental Farm.
4.	*E. A. FORWARD..... A.M. Can. Soc. C E. Dickinson's Landing, Ont.	Asst. Engineer, Cornwall Canal.
3.	*A. T. GRAY, B.A.Sc..... Schenectady, N.Y.	With General Electric Co.
3.	W. A. B. HICKS..... Buffalo, N.Y.	With Lackawanna Steel Co.
4.	C. F. KING..... Ottawa, Ont.	Geological Survey.
1.	H. W. PROUDFOOT..... Matawin, Ont.	With Jack Lake Mining Co.

\* Diploma with honors.

## 1897—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
2.	*A. H. A. ROBINSON, B.A.Sc. ....	With Intercolonial Coal Mining Co., Westville, N.S. Limited.
4.	W. F. SCOTT.....	Structural Engineer for J. G. Howard, Berkeley, Cal. Archt. University of California.
3.	*R. W. SMILEY, B.A.Sc. . . . .	With Wellman-Seaver & Morgan Cleveland, O. Engineering Co.
2.	*W. W. STULL, B.A.Sc., O.L.S. . .	With DeMorest & Silvester, Sudbury, Ont. Engineers and Surveyors.
1.	*M. B. WEEKES, B.A.Sc., D.L.S. .	Surveying Staff, Dept. of the Ottawa, Ont. Interior.
1.	E. A. WELDON . . . . .	Engineering Staff, Can. Northern Winnipeg, Man. Ry.

## 1898

1. W. H. BOYD, B.A.Sc. .... Geological Survey.  
Ottawa, Ont.
2. W. E. H. CARTER, B.A.Sc. .... Secretary, Bureau of Mines.  
Toronto, Ont.
3. E. H. DARLING..... With Hamilton Bridge Works Co.  
Hamilton, Ont.
1. W. F. GRANT, B.A.Sc. .... Town Engineer.  
Sault Ste. Marie.
1. T. S. KORMANN, B.A.Sc. .... Manager, Kormann Brewing Co.  
Toronto, Ont.
3. J. E. LAVROCK. .... With Niagara Falls Power Co.  
Niagara Falls, N.Y.
4. D. MACKINTOSH ..... Post Graduate Course,  
Ithaca, N.Y. Cornell University.
1. F. W. McNAUGHTON, O.L.S. .... Town Engineer.  
Cornwall, Ont.
1. J. H. SHAW, O.L.S. .... Surveyor.  
North Bay, Ont.
3. A. E. SHIPLEY, B.A.Sc. .... With United Coke & Gas Co.  
277 Broadway,  
New York, N.Y.
3. \*F. C. SMALLPEICE, B.A.Sc. .... With Canadian General Electric Co.  
Toronto, Ont.
1. R. W. SMITH, P.L.S. .... Surveyor.  
Rossland, B.C.
1. \*J. A. STEWART, M.A. .... Estimating and Designing Dept.,  
Pittsburgh, Pa. McClellent-Marshall Construction  
Co.

\* Diploma with honors.

## 1898—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1. *H. L. VERCOE .....	Engineering Staff, Winnipeg, Man.	Can. Northern Ry.
3. T. A. WILKINSON.....	Electrical Engineer, Ballantyne & New York, N.Y.	Evans, 20 Nassau st.
3. D. A. WILLIAMSON, B.A.Sc.....	With Hamilton Bridge Works Co. Hamilton, Ont.	

## 1899

3. T. BARBER.....	With Georgian Foundry. Meaford, Ont.	
2. J. T. M. BURNSIDE, B.A.Sc.....	Lient. Gold Coast Reg. West African Gold Coast W. Africa.	Frontier Force.
3. L. B. CHUBBUCK, B.A.Sc.....	Engineering Dept., Westinghouse Pittsburgh, Pa.	Electric and Mfg. Co.
2. G. A. CLOTHIER.....	With St. Eugene Construction and Moyie, B.C.	Milling Co., Limited.
1. C. COOPER .....	Surveyor. Carlyle, Assa.	
2. R. W. COULTHARD, B.A.Sc.....	Chief Chemist, Crow's Nest Pass Ferne, B.C.	Coal Co.
3. J. A. CRAIG, B.A.Sc.....	Office of Delano-Osborne Engineering Toronto, Ont.	Co.
2. J. C. ELLIOT.....	With Mother Lode Mine. Bella Bella, B.C.	
3. W. E. FORMAN, B.A.Sc .....	With the Westinghouse Electric and Pittsburgh, Pa.	Mfg. Co.
3. E. GUY, B.A.Sc.....	Engineering Dpt. Westinghouse Pittsburgh, Pa.	Electric and Mfg. Co.
3. *W. A. HARE, B.A.Sc.....	With Illinois Steel Co. Joliet, Ill.	
1. R. LATHAM, B.A.Sc.....	Asst. Engineer, T. H. & B. Ry. Hamilton, Ont.	
3. W. MONDS, B.A.Sc.....	Engineer for Munro & Piggot con- Webbwood, Ont.	tractors.
1. J. PATTERSON, B.A.....	Professor of Physics, Muir Central Allahabad, India.	College.
3. A. S. H. POPE, B.A.Sc.....	Testing Dpt. Westinghouse Electric Pittsburgh, Pa.	& Mfg. Co.
2. *G. E. REVELL, B.A.Sc.....	Office of Ross & Holgate, Engineers. Montreal, P.Q.	
3. *E. RICHARDS, B.A.Sc.....	With Toronto Electric Light Co. Toronto, Ont.	

\* Diploma with honors.

## 1899—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	G. A. SAUNDERS .....	With General Electric Co. Schenectady, N. Y.
1.	*T. SHANKS, B.A. Sc., D.L.S.....	Topographical Surveys Branch, Dept Ottawa, Ont. of the Interior.
1.	*D. C. TENNANT, B.A.Sc.....	With Dominion Bridge Co. Montreal, P.Q.
3.	W. W. VANEVRY.....	With Lackawana Steel Co. Lebanon, Pa.
2.	G. H. WATT, D.L.S.....	Topographical Surveys Branch, Dept. Ottawa, Ont. of Interior.
3.	W. E. WAGNER, B.A.Sc.....	Fellow in Mechanical Engineering Toronto, Ont. School of Practical Science.
3.	E. YEATES.....	With London Machine Tool Co. London, Ont.

## 1900

1.	J. L. ALLAN.....	Office of Provincial Engineer. Halifax, N. S.
2.	E. G. R. ARDAGH, B.A.Sc.....	Fellow in Chemistry, Toronto, Ont. School of Practical Science.
3.	J. A. BAIN.....	Structural Dept. S. V. Huber & Co., Pittsburgh, Pa. Constructing Engineers.
3.	J. H. BARLEY, B.A.Sc.....	With Stanley Electric Mfg Co. Pittsfield, Mass.
2.	*M. C. BOSWELL, B.A.Sc.....	Lecture Assistant, Toronto, Ont. School of Practical Science.
1.	L. T. BRAY, D.L.S.....	Surveyor. Galt, Ont.
3.	J. CLARK.....	Mechanical Engineer, Grace Mine. Michipicoten Harbor, Ont.
2.	J. E. DAVISON, B.A.Sc., .....	Asst. Engineer, Toronto St. Ry. Toronto, Ont.
3.	E. D. DICKINSON .....	With General Electric Co. Schenectady, N. Y.
3.	G. W. DICKSON, B.A.Sc.....	Electrical Construction Department, Buffalo, N. Y. Lackawana Steel Co.
2.	*H. A. DIXON, B.A.Sc., O.L.S...	Office of J. H. Moore, O.L.S., Smith's Falls, Ont. Engineer and Surveyor.
2.	C. H. FULLERTON .....	Firm of Dunn and Fullerton, Civil Winchester, Ont. Engineers.
3.	W. S. GUEST .....	Draftsman. C. H. Riches & Co., Toronto. Patent Solicitors.

\* Diploma with honors.

## 1900—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
3.	W. HEMPHILL, B.A.Sc. ....	With Cataract Power and 40 Court St., Buffalo, N.Y.     Conduit Co.
3.	S. E. M. HENDERSON. ....	With General Electric Co. Schenectady, N.Y.
3.	J. A. HENRY ..... .	With General Electric Co. Schenectady, N. Y.
2.	H. S. HOLCROFT, B.A.Sc., D.L.S.	Surveyor. Toronto, Ont.
3.	H. A. JOHNSTON.....	Cleveland Variety Works. Cleveland, O.
3.	J. C. JOHNSTON .....	City Engineer's Staff. Toronto, Ont.
2.	* J. A. JOHNSTON, B.A.Sc., .....	Asst. Mines Manager, Sault Ste. Marie, Ont.     Algoma Commercial Co.
2.	R. E. MCARTHUR, .....	Engineering Staff, Pennsylvania Ry. Pittsburgh, Pa.
2.	J. G. McMILLAN, B.A.Sc. . . . .	Fellow in Mining, Toronto, Ont.     School of Practical Science.
3.	L. HAUN MILLER.....	With Wellman-Sever & Morgan En- Cleveland, O.     gineering Co.
2.	E. V. NEELANDS, B.A.Sc. ....	Fellow in Surveying, Toronto, Ont.     School of Practical Science.
1.	*E. H. PHILLIPS, D.L.S. ....	Topographical Surveys Branch, Ottawa, Ont.     Dept. of the Interior.
2.	J. R. ROAF, B.A.Sc. ....	Draftsman, Crows' Nest Pass Coal Ferne, B.C.     Co.
3.	*C. H. E. ROUNTHWAITE .....	Asst. Superintendent Canadian Elec- Sault Ste. Marie, Ont. .... tro-Chemical Co., Limited.
2.	H. W. SAUNDERS, B.A.Sc. . . . .	Engineering Dept. Cambria Steel Co. Johnstown, Pa.
1.	A. TAYLOR ..... .	With C. P. R. Land Department. Winnipeg, Man.
1.	W. C. TENNANT, B.A.Sc. ....	Fellow in Civil Engineering, Toronto, Ont.     School of Practical Science.
2.	S. M. THORNE, B.A. Sc .....	Engineering Staff, Ontario Niagara Falls, Ont.     Power Co.
1.	F. W. THOROLD, B.A.Sc. ....	City Engineer. Calgary, Assa.
1.	H. M. WEIR, B.A. Sc .....	With Cleveland Gas, Light and Cleveland, O.     Coke Co.
3.	F. D. WITHROW .....	Inspector of Materials for Illsley Toronto, Ont.     & Horn, King Edward Hotel.

\* Diploma with honors.



## 1901

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	R. H. BARRETT, B.A.Sc., O.L.S. . . . .	Office of J. L. Morris, Engineer and Pembroke, Ont. Surveyor.
3.	W. G. BEATTY, . . . . .	Manager, Beatty Bros. Implement Fergus, Ont. Manufacturers.
3.	G. M. BERTRAM . . . . .	Office of Sullivan Machinery Co. 71 Broadway, New York.
3.	W. J. BOWERS . . . . .	Office of Willis Chipman, C.E. Toronto, Ont.
3.	E. T. J. BRANDON, B.A.Sc. . . . .	Engineering Staff, Ontario Niagara Falls. Power Co.
3.	W. P. BRERETON . . . . .	Post-Graduate Course, Toronto, Ont. School of Practical Science.
3.	J. T. BROUGHTON . . . . .	Draftsman, Mesta Machine Co. Pittsburgh, Pa.
3.	*W. G. CHACE . . . . .	Post-Graduate Course, Toronto, Ont. School of Practical Science.
3.	A. G. CHRISTIE . . . . .	Erecting Engineer, Westinghouse Pittsburgh, Pa. Machine Co.
3.	J. R. COCKBURN, B.A. Sc. . . . .	Draftsman, Polson Iron Works. Toronto, Ont.
1.	W. A. DUFF . . . . .	Draftsman, The Kenwood Bridge Co. Grand Crossing, Ill.
2.	*D. E. EASON, B.A. Sc. . . . .	Engineering Staff, Trent Valley Canal. Peterboro, Ont.
1.	*S. GAGNÉ . . . . .	Post-Graduate Course, Grand Forks, B.C. School of Practical Science.
3.	N. R. GIBSON . . . . .	Draftsman, Jenckes Machine Co. Sherbrooke, P.Q.
1.	C. HARVEY, B.A. Sc. . . . .	Asst. Surveyor to G. B. Abrey, D.L.S. Indian Head, Assa. in N.W.T.
2.	A. T. E. HAMER . . . . .	Assayor, Rock Lake Mining Co. Bruce Mines, Ont.
2.	F. C. JACKSON . . . . .	Res. Engineer, Temiskaming Ry. North Bay, Ont.
3.	*A. LAIDLAW . . . . .	Engineering Staff, National Portland Toronto, Ont. Cement Co.
3.	W. C. LUMBERS . . . . .	Draftsman, C.P.R. Engineer's Office. Toronto, Ont.
3.	A. C. MACDOUGALL . . . . .	Draftsman, Pittsburgh Reduction Co. Pittsburgh, Pa.
3.	A. T. C. McMASTER . . . . .	Draftsman, Cramp Steel Co. Collingwood, Ont.

\* Diploma with honors.

## 1901—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1.	G. MACMILLAN . . . . .	Engineering Staff, Canadian Northern Ry.
3.	*H. G. McVEAN, B. A. Sc. . . . .	Demonstrator in Mechanical Engineering, School of Practical Science.
2.	W. C. MATHESON . . . . .	Assayer, Canadian Gold Fields Co. Delora, Ont.
3.	H. T. MIDDLETON . . . . .	Draftsman, Pittsburgh Reduction Co. Pittsburgh, Pa.
2.	J. L. R. PARSONS, B.A. . . . .	Asst. Surveyor to H. D. Sewell, Battleford, Sask. D.L.S.
1.	G. H. POWER . . . . .	Office of Willis Chipman, C.E. Toronto, Ont.
3.	*H. W. PRICE, B. A. Sc. . . . .	Demonstrator in Electrical Engineering, School of Practical Science.
1.	H. P. RUST, B. A. Sc. . . . .	Engineering Staff, Canadian Niagara Power Co.
3.	M. V. SAUER, B. A. Sc. . . . .	Fellow in Electrical Engineering, School of Practical Science.
3.	W. H. STEVENSON, B. A. Sc. . . . .	Construction Engineer, Electrical Dept., Lackawanna Steel Co.
1.	R. D. WILLSON . . . . .	Engineering Staff, Canadian Northern Ry.

## 1902

3.	*H. G. BARBER . . . . .	Assistant City Engineer. Guelph, Ont.
1.	W. J. BLAIR . . . . .	Post-Graduate Course, School of Practical Science.
3.	J. M. BROWN . . . . .	With Westinghouse Machine Co., Steam Turbine Dept.
2.	W. G. CAMPBELL . . . . .	Construction Dept., Lackawanna Steel Co.
2.	A. R. CAMPBELL . . . . .	Asst. Engineer on Dry Docks. Sault Ste. Marie, Ont.
2.	*W. CHRISTIE . . . . .	Post-Graduate Course, School of Practical Science.
2.	F. T. CONLON . . . . .	With J. & T. Conlon. Little Current, Ont.
3.	H. V. CONNOR . . . . .	Post-Graduate Course, School of Practical Science.
2.	*M. T. CULBERT . . . . .	Post-Graduate Course, School of Practical Science.

\* Diploma with honors.

## 1902—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
2.	R. CUMMING..... Montreal, Que.	Post-Graduate Course, McGill University.
1.	W. E. DOUGLAS, B.A..... Toronto, Ont.	Office of Willis Chipman, C.E.
3.	*R. J. DUNLOP..... Pittsburg, Pa.	With Westinghouse Electric and Manufacturing Co.
2.	W. M. EDWARDS..... Smith's Falls, Ont.	Office of J. H. Moore, O. L. S., Town Engineer.
3.	W. ELWELL..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
2.	J. M. EMPEY..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
2.	*D. L. H. FORBES..... Eveleth, Minn.	Asst. Mining Engineer, Minnesota Iron Co.
1.	*A. E. GIBSON..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
3.	A. C. GOODWIN..... New Kensington, Pa.	Draftsman, Pittsburgh Reduction Co.
3.	C. HENWOOD..... Pittsburgh, Pa.	With Edgar Thompson Steel Plant.
3.	D. M. JOHNSTON..... Toronto, Ont.	Draftsman, United Electric Co.
2.	R. H. KNIGHT..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
5.	*F. L. LANGMUIR..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
3.	A. H. MCBRIDE..... Toronto, Ont.	Fellow in Drawing, School of Practical Science.
1.	A. L. MCLENNAN..... Toronto, Ont.	Office of J. McDougall, C.E., York Co. Engineer.
3.	J. T. MACKAY..... Peterboro, Ont.	With Canadian General Electric Co., Testing Dept.
3.	J. F. S. MADDEN..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
3.	*C. H. MARRS..... Hamilton, Ont.	Draftsman, Hamilton Bridge Works Co.
3.	P. MATHISON..... Toronto, Ont.	Post-Graduate Course, School of Practical Science.
3.	R. S. MENNIE..... Pittsburgh, Pa.	Draftsman, Riter-Conley Mfg. Co.
2.	H. H. MOORE..... Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.

\* Diploma with honors.

## 1902—Continued.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1. *T. S. NASH.....	Topographical Survey's Branch, Ottawa, Ont.	Department of the Interior.
1. G. C. POWELL.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.
1. *W. F. RATZ.....	Topographical Survey's Branch, Ottawa, Ont.	Department of the Interior.
3. H. D. ROBERTSON.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.
3. *D. SINCLAIR.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.
2. *I. J. STEELE.....	Topographical Survey's Branch, Ottawa, Ont.	Department of the Interior.
3. W. H. SUTHERLAND.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.
3. *T. TAYLOR.....	Structural Department, Riter-Conley Pittsburgh, Pa.	Manufacturing Co.
2. C. M. TEASDALE.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.
3. A. A. WANLESS.....	Engineering Staff, Nova Scotia Steel Sydney Mines, N.S.	and Coal Co.
3. H. J. ZAHN.....	Post-Graduate Course, Toronto, Ont.	School of Practical Science.

## CERTIFICATES.

## METALLURGY AND ASSAYING.

COURSE.	NAME AND ADDRESS.	OCCUPATION.
1896. G. JOHNSTON.....		
1896. A. T. TYE.....		
1897. E. B. WEBSTER.....		
1898. A. N. McMILLAN.....	Penetanguishene, Ont.	
1900. A. H. SMITH.....	Mining Engineer, Los Reyes Gold Mining & Milling Co.	
1901. G. A. HUNT.....		

## ELECTRICITY.

1896. E. I. SIFTON.....	Manager, London Electric Construc- tion Co.
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\* Diploma with honors.

## INDEX TO GRADUATES.

In the following alphabetical list of the Graduates is given the year of graduation of each student. In the preceding list, which is arranged by classes in the order of graduation, may be found additional information as to occupation, addresses, etc.

### A

Alison, T. H.....	1892	Apsey, J. F. ....	1888
Allan, J. R ..	1892	Ardagh, J. A .....	1893
Allan, J. L .....	1900	Ardagh, E. G. R. ....	1900
Anderson, A. G .....	1892	Armstrong, J.....	1895
Andrews, E. .	1897	Ashbridge, W. T.....	1888
Angus, R. W .....	1894		

### B

Bain, J. A. ....	1900	Bowman, H. J.....	1885
Bain, J. W .....	1896	Bowman, A. M .....	1886
Ball, E. F.....	1888	Bowman, F. M. .	1890
Ballantyne, H. F. ....	1893	Boyd, D. G.....	1894
Barber, H. G.....	1902	Boyd, W. H. ...	1898
Barber, T. ....	1899	Brandon, E. T. J. ....	1901
Barker, H. P.....	1893	Bray, L. T.....	1900
Barley, J. H. ....	1900	Brebner, G.....	1895
Barrett, R. H.....	1901	Brereton, W. P ....	1901
Beatty H. J. ....	1890	Brodie, W. M.....	1895
Beatty, W. G. ....	1901	Broughton, J. T.....	1901
Beauregard, A. T. ....	1894	Brown, J. M. ....	1902
Bergey, A. E.....	1894	Brown, D. B.....	1888
Bertram, G. M. ....	1901	Brown, G. L. ....	1893
Blackwood, A. E. ....	1895	Brown, L. L. ....	1895
Blair, W. J.....	1902	Bucke, M. A. (deceased) ...	1890
Bleakely, F. W.....	1885	Bucke, W. A. ....	1894
Boswell, E. J.....	1895	Burns, D .....	1883
Boswell, M. C....	1900	Burns, J. C. (deceased).....	1887
Boustead, W. E. (deceased) ..	1890	Burnside, J. T. M.....	1899
Bow, J. A .....	1897	Burwash, L. T.....	1896
Bowers, W. J.....	1901		

### C

Campbell, W. G.....	1902	Carey, B .....	1889
Campbell, A. R .....	1902	Carpenter, H. S ....	1897
Campbell, R. J.....	1895	Carter, W. E. H. ....	1898
Campbell, G. M.....	1896	Chace, W. G.....	1901
Canniff, C. M .....	1888	Chalmers, W. J.....	1889

## C

Chalmers, J. ....	1894	Cockburn, J. R. ....	1901
Charlesworth, L. C. ....	1893	Conlon, F. T. ....	1902
Charlton, H. W. ....	1897	Connor, H. V. ....	1902
Chewitt, H. J. ....	1888	Connor, A. W. ....	1895
Christie, W. ....	1902	Cooper, C. ....	1899
Christie, A. G. ....	1901	Corrigan, G. D. (deceased) ..	1890
Chubbuck, L. B. ....	1899	Coulthard, R. W. ....	1899
Clark, J. ....	1900	Craig, J. A. ....	1899
Clement, W. A. ....	1889	Culbert, M. T. ....	1902
Clothier, G. A. ....	1899	Cumming, R. ....	1902

## D

Darling, E. H. ....	1898	Dobie, J. S. ....	1895
Davison, J. E. ....	1900	Douglas, W. E. ....	1902
Deacon, T. R. ....	1891	Duff, J. A. (deceased) ....	1890
DeCew, J. A. ....	1896	Duff, W. A. ....	1901
Dickinson, E. D. ....	1900	Duggan, G. H. ....	1883
Dickson, G. W. ....	1900	Dunlop, R. J. ....	1902
Dill, C. W. ....	1891	Dunn, T. H. ....	1893
Dixon, H. A. ....	1900		

## E

Eason, D. E. ....	1901	Elwell, W. ....	1902
Edwards, W. M. ....	1902	Empey, J. M. ....	1902
Elliott, H. P. ....	1896	English, A. B. (deceased) ..	1890
Elliot, J. C. ....	1899	Ewart, J. A. ....	1894

## F

Fairbairn, J. M. R. ....	1893	Forman, W. E. ....	1899
Fairchild, C. ....	1892	Forward, E. A. ....	1897
Fingland, W. ....	1893	Francis, W. J. ....	1893
Forbes, D. L. H. ....	1902	Fullerton, C. H. ....	1900
Forester, C. ....	1893		

## G

Gagné, S. ....	1901	Goodwin, J. B. ....	1892
Garland, N. L. ....	1890	Grant, W. F. ....	1898
Gibbons, J. ....	1888	Gray, A. T. ....	1897
Gibson, A. E. ....	1902	Guernsey, F. W. ....	1895
Gibson, N. R. ....	1901	Gurney, W. C. ....	1896
Goldie, A. R. ....	1893	Guest, W. S. ....	1900
Goodwin, A. C. ....	1902	Guy, E. ....	1899



## H

Haight, H. V. ....	1896	Henderson, S. E. M. ....	1900
Hamer, A. T. E. ....	1901	Henry, J. A. ....	1900
Hanly, S. C. ....	1893	Henwood, C. ....	1902
Hanning, G. F. ....	1889	Herald, W. J. ....	1894
Hare, W. A. ....	1899	Hermon, E. B. ....	1886
Harkness, A. H. ....	1895	Hicks, W. A. B. ....	1897
Harvey, C. ....	1901	Holcroft, H. S. ....	1900
Haultain, H. E. T. ....	1889	Hull, H. S. ....	1895
Hemphill, W. ....	1900	Hutcheon, J. ....	1890
Henderson, E. E. ....	1885		

## I

Innis, W. L. ....	1890	Irvine, J. ....	1889
-------------------	------	-----------------	------

## J

Jackson, F. C. ....	1901	Johnston, A. C. ....	1894
James, O. S. ....	1891	Johnston, S. M. ....	1894
James, D. D. ....	1889	Johnston, H. A. ....	1900
Jeffrey, D. ....	1882	Johnston, J. C. ....	1900
Job, H. E. ....	1894	Johnston, J. A. ....	1900
Johnston, D. M. ....	1902	Jones, J. E. ....	1894

## K

Keele, J. ....	1893	Kirkland, W. C. ....	1884
Kennedy, J. H. ....	1882	Korman, T. S. ....	1898
King, C. F. ....	1897	Knight, R. H. ....	1902

## L

Laidlaw, J. T. ....	1893	Lash, N. M. ....	1894
Laidlaw, A. ....	1901	Latham, R. ....	1899
Laing, W. F. ....	1896	Lavrock, J. E. ....	1898
Laing, A. T. ....	1892	Lawson, W. ....	1892
Laird, R. ....	1886	Lawrie, R. R. (deceased) ....	1896
Lane, A. ....	1891	Lea, W. A. ....	1892
Langmuir, F. L. ....	1902	Lott, A. E. ....	1887
Langley, C. E. ....	1892	Ludgate, B. A. ....	1885
Laschinger, E. J. ....	1892	Lumbers, W. C. ....	1901
Lash, F. L. ....	1893		

## Mac

MacBeth, C. ....	1896	Macallum, A. F. ....	1893
MacKay, J. T. ....	1902	Macdougall, A. C. ....	1901
MacMillan, C. ....	1901	Mackintosh, D. ....	1898

## Mc

McAllister, J. E.....	1891	McKay, O. ....	1885
McAllister, A. L. ....	1893	McKay, W. N. ....	1895
McAree, J. ....	1882	McKinnon, H. L. ....	1895
McArthur, R. E.....	1900	McLennan, A. L. ....	1902
McBride, A. H. . . . .	1902	McMaster, A. T. C. ....	1901
McCulloch, A. L. ....	1887	McMillan, J. C.....	1900
McDougall, J. ....	1884	McMurchy, J. A. ....	1896
McDowall, R. . . . .	1888	McNaughton, F. W.....	1898
McEntee, B. ....	1892	McPherson, A. J. ....	1893
McFarlen, G. W. ....	1888	McTaggart, A. L. ....	1894
McFarlen, T. J.....	1893	McVean, H. G. ....	1901
McGowan, J. ....	1895		

## M

Madden, J. F. S.....	1902	Middleton, H. T. ....	1901
Main, W. T.....	1893	Mill, F. X. (deceased) ...	1889
Marani, C. J.....	1888	Miller, L. Haun.....	1900
Marani, V. G.....	1893	Milne, C. G. ....	1892
Marrs, C. H. . . . .	1902	Mines, W. . . . .	1893
Martin, F. ....	1887	Minty, W. . . . .	1894
Martin, T. ....	1896	Mitchell, C. H. . . . .	1892
Matheson, W. C. ....	1901	Moberly, H. K. ....	1889
Mathison, P. ....	1902	Monds, W. ....	1899
Meadows, W. W. ....	1895	Moore, H. H. ....	1902
Mennie, R. S.....	1902	Moore, J. H. ....	1888
Merrill, E. B.....	1890	Moore, J. E. A. ....	1891
Mickle, G. R.....	1888	Morris, J. L. ....	1881

## N

Nash, T. S.....	1902	Newman, W. ....	1891
Neelands, E. V.....	1900	Nicholson, C. J.. . . .	1894

## P

Parsons, J. L. R. ....	1901	Pope, A. S. H. ....	1899
Patterson, J. ....	1899	Powell, G. G. ....	1902
Pedder, J. R. (deceased) ....	1890	Power, G. H. ....	1901
Phillips, E. H. ....	1900	Prentice, J. M. (deceased) ..	1892
Pinhey, C. H. ....	1887	Price, H. W. ....	1901
Playfair, N. L. ....	1892	Proudfoot, H. W. ....	1897

## R

Ratz, W. F. ....	1902	Robertson, H. D. ....	1902
Raymer, A. R. ....	1884	Robertson, J. ....	1884
Revell, G. E. ....	1899	Robertson, J. M. ....	1893
Richards, E. ....	1899	Robinson, J. K. (deceased) ..	1891
Richardson, G. H. ....	1888	Robinson, F. J. ....	1895
Roaf, J. R. ....	1900	Robinson, A. H. A. ....	1897

R

Rogers, J. ....	1887	Ross, J. A. ....	1892
Rolph, H. ....	1894	Rounthwaite, C. H. E. ....	1900
Rose, K. ....	1888	Russel, W. B. ....	1891
Roseburgh, T. R. ....	1889	Russel, R. ....	1893
Ross, J. E. ....	1888	Rust. H. P. ....	1901
Ross, R. A. ....	1890		

S

Sauer, M. V. ....	1901	Smith, A. ....	1894
Saunders, G. A. ....	1899	Smith, R. W. ....	1898
Saunders, H. W. ....	1900	Speller, F. N. ....	1893
Scott, W. F. ....	1897	Spotton, A. K. ....	1894
Shanks, T. ....	1899	Squire, R. H. ....	1893
Shaw, J. H. ....	1898	Steele, I. J. ....	1902
Shields, J. D. ....	1894	Stern. E. W. ....	1884
Shipe, R. R. ....	1896	Stevenson, W. H. ....	1901
Shipley, A. E. ....	1898	Stewart, J. A. ....	1898
Silvester G. E. ....	1891	Stocking, F. T. ....	1895
Sinclair, D. ....	1902	Stull, W. W. ....	1897
Smallpeice, F. C. ....	1898	Sutherland, W. H. ....	1902
Smiley, R. W. ....	1897	Symmes, A. D. ....	1891
Smith, A. N. ....	1892		

T

Taylor, T. ....	1902	Thomson, R. W. ....	1892
Taylor, W. V. ....	1893	Thorne, S. M. ....	1900
Taylor, A. ....	1900	Thorold, F. W. ....	1900
Teasdale, C. M. ....	1902	Tremaine, R. C. C (deceased)	1895
Tennant, D. C. ....	1899	Tyrrell, J. W. ....	1883
Tennant, W. C. ....	1900	Tyrrell, H. G. ....	1886
Thomson, T. K. ....	1886		

V

VanEvery, W. W. ....	1899	Vercoe, H. L. ....	1898
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W

Wanless, A. A. ....	1902	Wiggins, T. H. ....	1890
Watson, R. B. ....	1893	Wilkinson, T. A. ....	1898
Watts, G. H. ....	1899	Williamson, D. A. ....	1898
Wagner, W. E. ....	1899	Willson, R. D. ....	1901
Weekes, M. B. ....	1897	Withrow, W. J. ....	1890
Weir, H. M. ....	1900	Withrow, F. D. ....	1900
Weldon, E. A. ....	1897	Wright, C. H. C. ....	1888
White, A. V. ....	1892	Wright, R. T. ....	1894
Wickett, T. ....	1889		

Y

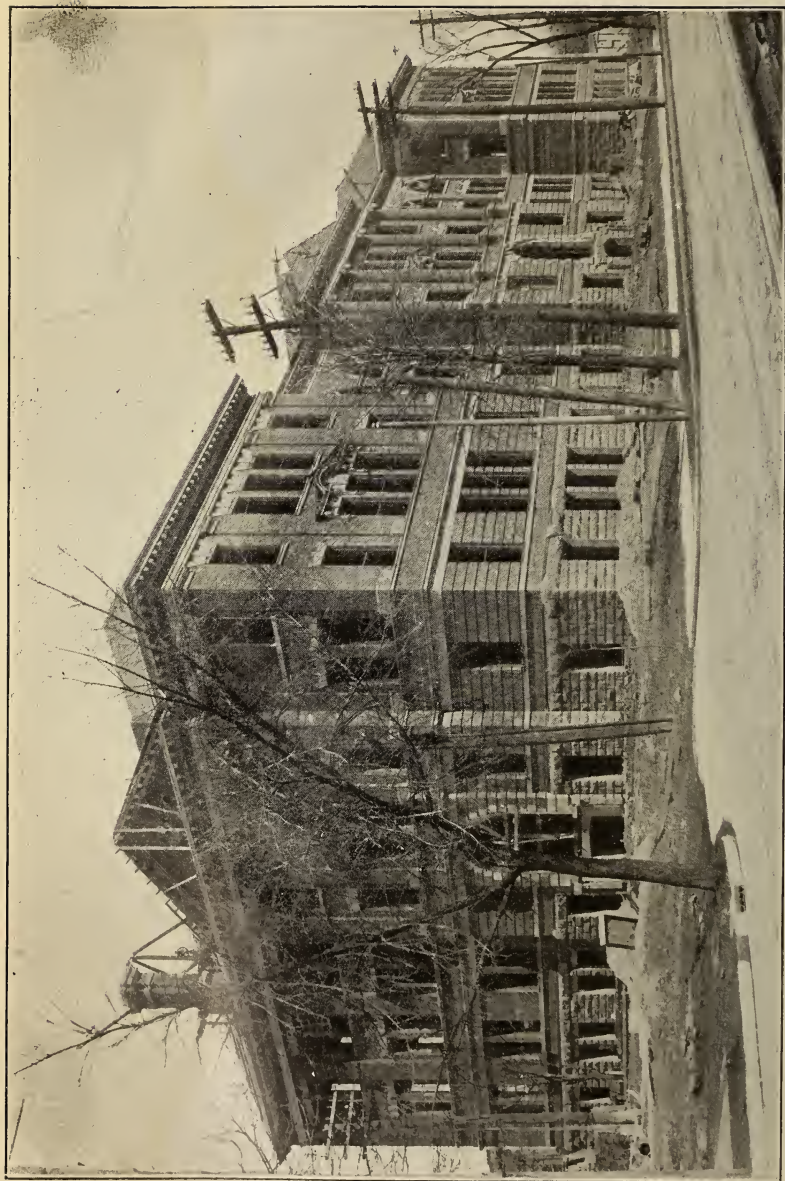
Yeates, E. ....	1899
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Z

Zahn, H. J. ....	1902
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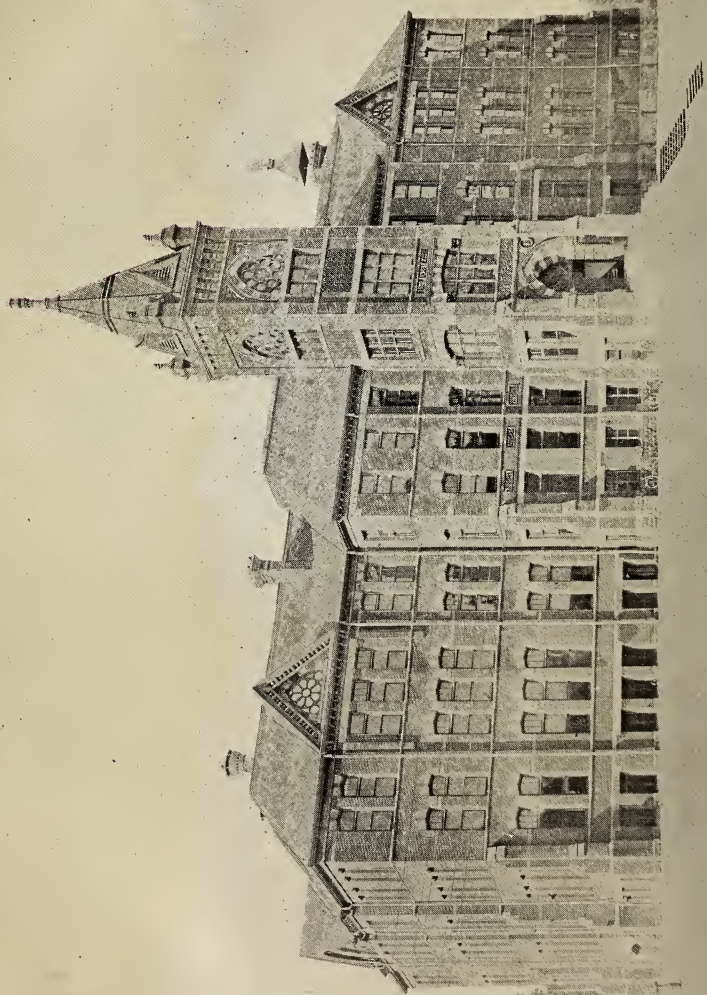




SCHOOL OF PRACTICAL SCIENCE, CHEMISTRY AND MINING BUILDING.

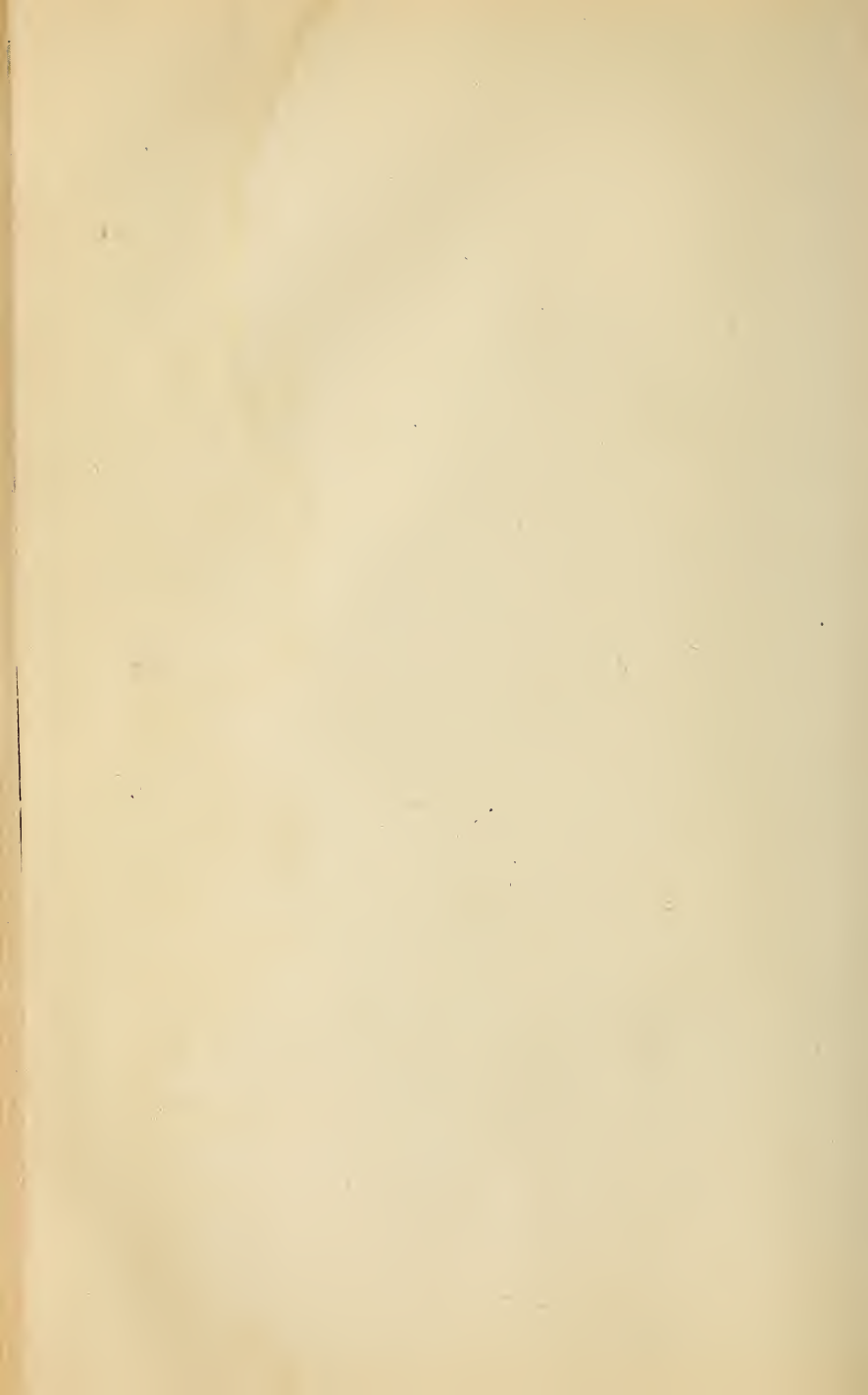






SCHOOL OF PRACTICAL SCIENCE, MAIN BUILDING.





# CALENDAR

OF THE

## Ontario School of Practical Science

(Affiliated to the University of Toronto)

Faculty of Applied Science and Engineering of the  
University of Toronto



Twenty-Seventh Session, 1904-1905  
TORONTO



WARWICK BROS. & RUTTER, Limited,  
Printers and Bookbinders,  
Toronto.



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# CALENDAR 1904-1905.

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1904. Sept. 26 Meeting of Council.  
 27 Supplemental Examinations begin.  
 30 Registration of Students.
- Oct. 3 First term begins.  
 Lectures and practical work begin.  
 Last day for presentation of Vacation work.
- 12 Meeting of Engineering Society.  
 14 Meeting of Council.  
 26 Meeting of Engineering Society.
- Nov. 9 Meeting of Engineering Society.  
 11 Meeting of Council.  
 23 Meeting of Engineering Society.
- Dec. 7 Meeting of Engineering Society.  
 9 Meeting of Council.  
 22 First term ends.
1905. Jan. 9 Second term begins.  
 13 Meeting of Council.  
 18 Meeting of Engineering Society.
- Feb. 1 Meeting of Engineering Society,  
 10 Meeting of Council.  
 15 Meeting of Engineering Society.
- March 1 Meeting of Engineering Society.  
 8 Ash Wednesday—building closed.  
 10 Meeting of Council.  
 15 Meeting of Engineering Society.  
 29 Meeting of Engineering Society.  
 31 Annual Meeting of Engineering Society.  
 Last day for presentation of thesis for B.A.Sc.
- Apr. 7 Meeting of Council.  
 8 Lectures and practical work close.  
 14 Annual Examinations begin.  
 21 Good Friday—building closed.
- May 5 Meeting of Board of Examiners.  
 10 Meeting of Council.
- June 9 University commencement.

The building will be closed on all public holidays and daily at 1 p. m. during July and August.

1904

## SEPTEMBER

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

## OCTOBER

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

## NOVEMBER

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
..	..	..	..	..	..	..

## DECEMBER

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
..	..	..	..	..	..	..

1905

## JANUARY

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

## FEBRUARY

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	..	..	..	..
..	..	..	..	..	..	..



## TIME TABLE—FIRST YEAR.

Session 1904-1905.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	
9-10	*Analytical Geometry, 1, 2, 3, 4, 6	*Trigonometry.	*Algebra.	*Euclid.	*Trigonometry.	9-10
10-11	*Electricity and Magnetism, 3, 5, 6 (a) Electricity, 3, 5, 6 (b) History of Architecture 4 Drawing, 1, 2	Drawing.	*Electricity and Magnetism, 3, 5, 6 (a) Drawing, 1, 2, 4, 6 Electricity, 3, 5, 6 (b)	Drawing. *Heat.	(a) *Electricity and Magnetism, 3, 5, 6 (a) (b) Electricity, 3, 5, 6 (b) Pen and Ink, 1, 2 Drawing, 3, 5 (b) do.	10-11
11-12	Statics, 1, 2, 3, 4, 6	Dynamics, 1, 2, 3, 4, 6	Drawing.	Dynamics, 1, 2, 3, 4, 6	Statics, 1, 2, 3, 4, 6	11-12
12-1	Surveying, 1, 2, 3, 4	Chemistry.	Chemistry.	Chemistry.	Descriptive Geometry, 1, 2, 3, 4, 6	12-1



# TIME TABLE.

11

2-3	*Mineral'gy, 1, 2, 4, 5, 6 Drawing, 3 (a) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2, 5, 6 (b) Drawing, 1, 3, 4 (b)	Chemical Lab'y, 5, 6 do. Electrical Lab'y, 3, 5, 6 Drawing, 2, 3 do. 1, 4 (a)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 3, 5, 6 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5, 6 Electrical Lab'y, 3, 5, 6 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b)	2-3
3-4	*Mineralogical Lab'y, 1, 2, 5, 6 (b) Drawing, 3 (a) do. 1, 2, 5 (a) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2, 5, 6 (b) Drawing, 1, 3, 4 (b)	Chemical Lab'y, 5, 6 do. Electrical Lab'y, 3, 5, 6 Drawing, 2, 4 do. 1, 4 (a)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (b) Chemical Lab'y, 3, 5, 6 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5, 6 Electrical Lab'y, 3, 5, 6 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b)	3-4
4-5	*Mineralogical Lab'y, 1, 2, 5, 6 (b) Drawing, 3 (a) do. 1, 2, 5 (a) Chemical Lab'y, 3 (b)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2, 5, 6 (b) Drawing, 1, 3, 4 (b)	Chemical Lab'y, 5, 6 do. Electrical Lab'y, 3, 5, 6 Drawing, 2, 4 do. 1, 4 (a)	*Physical Lab'y, 3, 5, 6 (a) Field Work, 1, 2, 4 (b) Chemical Lab'y, 3, 5, 6 (b) Drawing, 1, 2, 4 (b)	Chemical Lab'y, 5, 6 Electrical Lab'y, 3, 5, 6 Field Work, 1, 2, 4 (a) Drawing, 1, 2, 4 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. 6. Chemical Engineering. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drawing during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drawing during the remainder of the Session.

## SECOND YEAR.

TIME TABLE—SECOND YEAR.  
Session 1904-1905.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	
9-10	Descriptive Geometry, 1, 2, 3, 4, 6	Surveying (Lect.) 1, 2, 4, Electricity, 3, 5, 6,	Calculus 1, 2, 3, 4, 6.	*Astronomy, 1 Lithology, 2 Electricity, 3, 5, 6 History of Arch'te, 4	*Calculus, 1, 2, 3, 4, 6	9-10
10-11	Drawing, Organic Chemistry, 5	Applied Chemistry.	Spherical Trig'y. 1, 2, 3, (a) Orders of Arch'te, 4 Organic Chem'y, 5	Applied Chemistry.	History of Ornament, 4 Drawing, 1, 2, 3	10-11
11-12	Theory of Mechanism, 3, 6 Drawing, 1, 2, 4 *Elementary Physical Chemistry, 5, 6	Chemical Lab'y.	*Hydrostatics, (a) *Optics, (a)	Geology, 1, 2, 4, 5 Drawing, 3	Theory of Mechanism, 3, 6 Drawing, 1, 2, 4 *Elem. Phy. Chem'y, 5, 6	11-12
12-1	Strength of Materials, 1, 2, 3, 4, 6	Chemical Lab'y.	Strength of Materials, 1, 2, 3, 4, 6	Metallurgy.	Dynamics, 1, 2, 3, 6 Drawing, 4	12-1

2-3	Chemical Lab'y, Drawing, Electrical Lab'y, 3, 5, 6 Drawing, do	2 (a) 1, 2 (b) 3, 5, 6 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, 1, 2, 4 Drawing, 5 3, 6 (a)	1, 2, 4 (b) 5 3, 6 (a)	*Physical Lab'y, 3, 5, 6 (a) Chemical Lab'y, 2, 4 (b) Field Work, 1, 2, 4, (a) Drawing, 1, 3, 4, 6 (b) Chemical Lab'y, 5 (b)	2-3
3-4	Chemical Lab'y, Drawing, Electrical Lab'y, 3, 5, 6 Drawing, do	2 (a) 1, 2 (b) 3, 5, 6 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, 1, 2, 4 Drawing, 5 3, 6 (a)	1, 2, 4 (b) 5 3, 6 (a)	*Physical Lab'y, 3, 5, 6 (a) Chemical Lab'y, 2, 4 (b) Field Work, 1, 2, 4, (a) Drawing, 1, 3, 4, 6 (b) Chemical Lab'y, 5 (b)	3-4
4-5	Chemical Lab'y, Drawing, Electrical Lab'y, 3, 5, 6 Drawing, do	2 (a) 1, 2 (b) 3, 5, 6 4 1 (a)	*Physical Lab'y, Mineralogical Lab'y, Field Work, 1, 2, 4 Drawing, 5 3, 6 (a)	1, 2, 4 (b) 5 3, 6 (a)	*Physical Lab'y, 3, 5, 6 (a) Chemical Lab'y, 2, 4 (b) Field Work, 1, 2, 4, (a) Drawing, 1, 3, 4, 6 (b) Chemical Lab'y, 5 (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry. 6. Chemical Engineering. \*University of Toronto. (a) First Term. (b) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drawing during the months allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drawing during the remainder of the Session.

TIME TABLE—THIRD YEAR.  
Session 1904-1905.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	
9-10	Thermodynamics, 1, 2, 3, 3', 6 History of Arch'e, 4 *Biology, 5	Hydraulics, 1, 2, 3, 3', 4, 6	Thermodynamics, 1, 2, 3, 3', 6 Architectural Design, 4	Hydraulics, 1, 2, 3, 3', 4, 6	Mechanics of Machinery, 3, 3', 6 Principles of Dec'n, 4 Drawing, 1, 2, 5 *Biology,	9-10
10-11	Metallurgy, 2, 5, 6 Drawing, 1, 3, 3', 4	Theory of Construction, 1, 4 do 2, 3, 3', 6 (a) Chemical Lab'y, 2 (b) Mechanics of Machinery, 3, 6 (b) *Organic Chemistry, 5	Compound, Stress, Drawing, Assaying, Electro Chemistry, 3', 6	Theory of Construction, 1, 4 do 2, 3, 3', 6 (a) Chemical Lab'y, 2 (b)	Electricity, 1, 2, 4, 5 Drawing, 3, 3'	10-11
11-12	Ore Deposits, 2, 3' Drawing, 1, 3, 4, 6 Electrical Design,	Astronomy and Geodesy, 1 Electricity, 3, 3', 6 Chemical Lab'y, 2 (b) Drawing, 4	Assaying, Drawing, Mineralogical Lab'y, 2, 5, 6 (b) 1, 3, 3', 4 2, 5 (a)	Astronomy, Electricity, Chemical Lab'y, 2 (b) Drawing, 4	Mining and Ore Dressing, 2 Drawing, 1, 4 do 3, 6, (b) Alternating Current, 3, 3' (a)	11-12
12-1	Applied Chemistry.	Economic Geology, 1, 2, 4, 5, Machine Design, 3, 3', 6	Assaying, Drawing, Mineralogical Lab'y, 2, 5 (a) 2, 5, 6 (b) 1, 3, 3', 4	Economic Geology, 1, 2, 4, 5 Machine Design, 3, 3', 6	Applied Chemistry	12-1

2-3	*Physical Lab'y, 3, 5, 6 (a) Drawing, 1, 2 do 3, 3', (b) Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3, 8', 6 Drawing, 1, 2, 4, 6 (a) Theory of Least Squares, 1, 2, 4, (b) Drawing, 4 (b) Mill Design, 3 (b)	Field Work, 1, 2, 4, (a) Electrical Lab'y, 3, 8', 6 (a) Drawing, 1, 2, 4, (b) do 1, 4 (b) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3, 3' (b)	2-3
5-4	*Physical Lab'y, 3, 3', 5, 6 (a) Drawing, 1, 2, 4 do 3, 3' (b)	Field Work, 1, 2, 4, (a) Electrical Lab'y, 3, 8', 6 Assaying, 2, 5 (b) Drawing, 1, 4, 5 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3, 8', 6 Assaying, 2 (b) Drawing, 1, 4 (b) *Practical Biology, 5	3-4
4-5	*Physical Lab'y, 3, 3', 5, 6 (a) Surveying (Lect.) 1, 2, 4, (a) Drawing, 1, 2, 3, 3', 4 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3, 8', 6 Assaying, 2, 5 (b) Drawing, 1, 4, 5 (b)	Field Work, 1, 2, 4 (a) Electrical Lab'y, 3, 8', 6 (a) Assaying, 1, 4 (b) Field Work, 1, 2, 4 (a) Chemical Lab'y, 2 (b) Drawing, 3, 3' (b)	4-5

1. Civil Engineering ; 2. Mining Engineering ; 3 and 3'. Mechanical and Electrical Engineering ; 4. Architecture ; 5. Analytical and Applied Chemistry ; 6. Chemical Engineering ; \*University of Toronto (a) First Term. (b) Second Term. Subjects not numbered are in common to all the departments. In the department of the Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories. An option is allowed between the subjects indicated by 3 and those by 3'.

The work in the Physical laboratories closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drawing during the hours allotted to physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drawing during the remainder of the Session.

## FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such hours as suit the laboratory work.



## FACULTY OF THE SCHOOL.

---

*Principal*.....J. GALBRAITH, M.A., LL.D.  
*Registrar*.....A. T. LAING, B.A. Sc.

---

## MEMBERS OF TEACHING STAFF:

J. GALBRAITH, M.A., LL.D.....*Professor of Engineering (Chairman).*  
W. HODGSON ELLIS, M.A., M.B...*Professor of Applied Chemistry.*  
A. P. COLEMAN, M.A., Ph.D.....*Professor of Geology.*  
L. B. STEWART, O.L.S., D.T.S....*Professor of Surveying and Geodesy.*  
C. H. C. WRIGHT, B.A.Sc., Mem.  
O.A.A...*Professor of Architecture.*  
T. R. ROSEBRUGH, M.A.....*Professor of Electrical Engineering.*  
G. R. MICKLE, B.A.....*Lecturer in Mining.*  
R. W. ANGUS, B.A. Sc .....*Lecturer in Mechanical Engineering.*  
J. MCGOWAN, B.A., B.A.Sc .... *Lecturer in Applied Mechanics.*  
J. W. BAIN, B.A.Sc.....*Lecturer in Applied Chemistry.*  
H. G. MCVEAN, B.A.Sc.....*Demonstrator in Mechanical Engineering.*  
H. W. PRICE, B.A.Sc.....*Demonstrator in Electrical Engineering.*  
A. E. DAVISON, Grad. S.P.S.....*Fellow in Civil Engineering.*  
J. G. McMILLAN, B.A.Sc.....*Fellow in Mining Engineering.*  
S. B. WASS, Grad. S.P.S.....*Fellow in Mechanical Engineering.*  
H. M. SHIPE, Grad. S.P.S.....*Fellow in Electrical Engineering.*  
E. G. R. ARDAGH, B.A.Sc.....*Fellow in Chemistry.*  
C. G. WILLIAMS, Grad. S.P.S.....*Fellow in Chemistry.*  
J. R. COCKBURN, B.A.Sc.....*Fellow in Drawing.*  
J. L. R. PARSONS, B.A.....*Fellow in Surveying.*  
F. G. MARRIOTT, Grad. S.P.S.....*Lecture Assistant in Chemistry.*



## MEMBERS OF THE FACULTY OF ARTS:

whose classes are attended by the Regular Students of the School:

JAMES LOUDON, M.A., LL.D.....	<i>President and Professor of Physics.</i>
R. RAMSAY WRIGHT, M.A., LL.D.	<i>Professor of Biology.</i>
ALFRED BAKER, M.A.....	<i>Professor of Mathematics.</i>
W. R. LANG, D.Sc.....	<i>Professor of Chemistry.</i>
T. L. WALKER, M.A., Ph.D.....	<i>Professor of Mineralogy and Petrography.</i>
W. L. MILLER, B.A., Ph.D.....	<i>Associate Professor of Physical Chemistry.</i>
W. J. LOUDON, B.A.....	<i>Associate Professor in Physics.</i>
C. A. CHANT, M.A.....	<i>Lecturer in Physics.</i>
J. C. McLENNAN, B.A., Ph.D.....	<i>Associate Professor in Physics.</i>
ALFRED T. DeLURY, B.A.....	<i>Associate Professor of Mathematics.</i>
J. C. FIELDS, B.A., Ph.D.....	<i>Lecturer in Mathematics.</i>
W. A. PARKS, B.A., Ph.D.....	<i>Lecturer in Mineralogy.</i>
F. B. KENRICK, M.A., Ph.D.....	<i>Lecturer in Chemistry.</i>
F. B. ALLAN, M.A., Ph.D.....	<i>Lecturer in Chemistry.</i>
E. F. BURTON, B.A.....	<i>Assistant Demonstrator in Physics.</i>
L. K. FILE, B.A.....	<i>Assistant in Mathematics.</i>
M. T. CULBERT, B.A.Sc.....	<i>Class Assistant in Mineralogy.</i>
H. L. KERR, B.A.....	<i>Class Assistant in Mineralogy.</i>

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# SCHOOL OF PRACTICAL SCIENCE.

PROVINCE OF ONTARIO.

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## CALENDAR FOR THE SESSION 1904-1905.

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THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1899 by the transfer of the department of science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction of the above departments, the Senate of the University of Toronto passed a Statute in October, 1899, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor on the 30th day of October, 1889.

By an Order-in-Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the School was entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

By an Order-in-Council dated the 30th day of January, 1903, the Council of the School was made to consist of the Principal, the Professors and Lecturers, together with the Registrar.

The management and discipline of the School is vested in the Council.

By a Statute of the Senate of the University of Toronto, passed on December 14th, 1900, the teaching staff and examiners of the School of Practical Science, together with the examiners for the degree of B.A.Sc., and professional degrees in Engineering, were constituted ex-officio the Faculty of Applied Science and Engineering of the University of Toronto.

The statute is as follows :

By the Senate of the University of Toronto

Be it enacted :

1. That the Faculty of Applied Science and Engineering be hereby established.

2. That the course and examinations of the School of Practical Science leading to the diploma of the school and to the special certificates of the school, together with the courses and examinations leading to the degree of Bachelor of Applied Science (B.A.Sc.), Civil Engineer (C. E.), Mining Engineer (M. E.), Mechanical Engineer (M. E.), and Electrical Engineer (E. E.), be the curriculum and examinations of the University in the said faculty.

3. That the members of the teaching staff of the School of Practical Science be the members of the teaching staff of the University in the said faculty.

4. That the examiners for the School of Practical Science, whether members of the teaching staff of the said school or otherwise, together with the examiners for the degrees named in clause 2, be the examiners of the University in the said faculty.

5. That the regular students of the School of Practical Science in the first, second, third and fourth years respectively be the undergraduates of the University in the corresponding years in the said faculty.

6. That the non-regular, occasional and special students of the School of Practical Science be the non-regular, occasional and special students of the University in the said faculty.

7. That the provisions of this statute apply, as far as may be, to all graduates of the School of Practical Science and to all graduates of the University in Applied Science and Engineering.

8. That no liability shall be incurred by the University of Toronto for the support and maintenance of the faculty hereby established

### CHEMISTRY AND MINING BUILDING.

The new building now in course of erection on College Street is designed to accommodate the instruction in Chemistry, Electrochemistry, Metallurgy, Assaying, Mineralogy, Geology and Mining. The Milling building is immediately in the rear of the main building. The Geological Museum will be temporarily housed in the eastern portion of the main building.

It is expected that the new buildings will be ready for occupation in October, 1904.

### DEPARTMENTS.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz. —

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.
6. Chemical Engineering.

The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences actual professional work.

## DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

## DEGREE OF B. A. Sc.

After the general course is finished the Diploma of the School is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time allotted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the thesis are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B.A.Sc.).

## PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), or Electrical Engineer (E.E.), as the case may be, subject to the rules and regulations established by the University.





*This is to Certify that*

*of the \_\_\_\_\_ in the \_\_\_\_\_  
has completed the Regular Course  
of this School for the Diploma in the \_\_\_\_\_*

*extending over a period of three years, and comprising theoretical  
and practical instruction in the following subjects, viz:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Wherefore the said \_\_\_\_\_  
becomes duly entitled to receive this Diploma, having fulfilled  
to the satisfaction of the Faculty of the School, all the requirements  
thereunto relating;*

*In witness whereof we have signed this Diploma at  
Toronto, in the Province of Ontario, this \_\_\_\_\_ day of \_\_\_\_\_  
One thousand eight hundred and \_\_\_\_\_  
and have caused the Seal of this School to be hereunto affixed*

\_\_\_\_\_  
*Chairman*

\_\_\_\_\_  
*Secretary*

## ADMISSION.

Candidates will be admitted as regular students in any of the regular departments of instruction on presenting satisfactory certificates of having passed either :

(a) The matriculation examination in Arts, in any University in His Majesty's Dominions, or in all the subjects of such matriculation examination except Latin and Greek, provided, however, that if an alternative be allowed by the University between either Latin or Greek and modern subjects (e.g., Modern Languages, Physics, Chemistry, etc.), the latter subjects must be taken if the former are omitted :  
or

(b) The Junior Leaving Examination of the Province of Ontario, including either French or German.

The case of the University of Toronto will serve as an illustration. The subjects for pass Junior Matriculation in Arts in the University of Toronto are : English Composition, English Literature, English Grammar, Algebra, Euclid, Arithmetic, History (British, Canadian and Ancient), Latin and any two of the following : Greek, French, German, Experimental Science (Physics and Chemistry). A candidate who desires to enter the School of Practical Science as a regular student, without taking Latin or Greek, will be required to present a certificate from the Registrar that he has passed in the following subjects :—English Composition, English Literature, English Grammar, Algebra, Euclid, Arithmetic, History (British, Canadian and Ancient). and any two of the following :—French, German, and Experimental Science (Physics and Chemistry).

Applications for admission to the regular Departments based upon other certificates than those above mentioned will be considered by the Council. Such applications accompanied by the necessary certificates and information, must be in the hands of the Registrar of the School before September 20th.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

Occasional Students will be permitted to attend such courses of instruction as the council may approve, and such students will not be required to present entrance certificates,

## SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

No student will be allowed to begin the work of a new term until the fees and dues of the previous term have been paid.

No application for examinations will be received until all fees and dues have been paid.

YEAR.	DESCRIPTION OF PAYMENT.	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.	6. Chemical Engineering.
		\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
	Payable in First Term—						
I.	Sessional Fees.....	34 00	34 00	34 00	34 00	34 00	34 00
	Dues—						
	Library .....	1 00	1 00	1 00	1 00	1 00	1 00
	Deposits—						
	General .....	2 00	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory...	3 00	3 00	3 00	3 00	3 00	3 00
	Mineralogical Lab'y....	.....	.....	.....	.....	.....	.....
		40 00	40 00	40 00	40 00	40 00	40 00
	Payable in Second Term—						
	Sessional Fees.....	35 00	35 00	35 00	35 00	35 00	35 00
	Total .....	75 00	75 00	75 00	75 00	75 00	75 00
	II. Payable in First Term—						
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00	40 00
	Dues—						
	Library .....	1 00	1 00	1 00	1 00	1 00	1 00
	Deposits—						
	General .....	2 00	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory...	3 00	3 00	3 00	3 00	3 00	3 00
	Mineralogical Lab'y....	3 00	3 00	.....	.....	3 00	3 00
		49 00	49 00	46 00	46 00	49 00	49 00
	Payable in Second Term—						
	Sessional Fees.....	40 00	40 00	40 00	40 00	40 00	40 00
	Total .....	89 00	89 00	86 00	86 00	89 00	89 00

III. Payment in First Term—						
Sessional Fees.....	45 00	45 00	45 00	45 00	45 00	45 00
Dues—						
Library.....	1 00	1 00	1 00	1 00	1 00	1 00
Deposits—						
General .....	2 00	2 00	2 00	2 00	2 00	2 00
Chemical Laboratory...	.....	3 00	.....	.....	3 00	3 00
Mineralogical Lab'y.....	.....	3 00	.....	.....	3 00	.....
	48 00	54 00	48 00	48 00	54 00	51 00
Payable in Second Term—						
Sessional Fees.....	45 00	45 00	45 00	45 00	45 00	45 00
Total.....	93 00	99 00	93 00	93 00	99 00	96 00

The total expense of a regular three years' course in any department is about \$360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

Fourth or Post-Graduate Year.—The fees, etc., in this year are as follows :

Payable in First Term—

    Sessional Fees ..... \$35 00

    Dues, Library ..... 1 00

    Deposits, General ..... 2 00

Payable in Second Term—

    Sessional Fees ..... 35 00

    University Fees ..... 20 00

        Total .....\$93 00

Fourth year students must also pay the deposits of the laboratories in which they work.

Occasional Students.—The fees payable by occasional students depends upon the nature and the amount of work taken ; they must pay within one month from registration. All occasional students are required to pay the library due, \$1, and the general deposit, \$2. Those taking laboratory work are required to pay a deposit of \$6.

Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

### LODGING AND BOARD.

Accommodation is readily obtainable in numerous private boarding-houses within convenient distance of the School, at a cost of from three dollars and a half upwards for comfortable lodging with board ; or rooms may be rented at a cost of from one dollar and a half per week upwards, and board obtained separately at moderate rates. A list of accredited boarding-houses is kept by the Secretary of the University College Young Men's Christian Association, and students are recommended to consult him with reference to the selection of suitable accommodation.

### FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Surveying, Drawing, Analytical and Applied Chemistry, Lecture Assistant in Chemistry.

Each fellowship is of the value of \$500 per annum.

The fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Application for these fellowships are to be made annually to the Registrar on or before the 1st day of May.

### REGULATIONS RESPECTING EXAMINATIONS.

All students who are candidates for diplomas or certificates shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical work, or who has been reported to the Council for bad conduct and adjudged guilty thereof.

Candidates are required to send to the Registrar at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in September, notice in writing of their intention to take such examinations.



No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawing set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in drawing, the drawings already referred to must be made, together with as many others as may be prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five, and the maximum number thirty-five, except in the Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserves the right of disposing of the drawings as they may think proper. No drawings may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.



**Vacation Work.**

Vacation work must be handed in, on or before the first day of the session.

Vacation notes must be on construction only, and contain not less than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Thesis must be written on ordinary foolscap, and consist of not less than twenty, nor more than thirty pages.

Thesis must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for thesis in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and thesis.

**Supplemental Examinations, Etc.**

A candidate who fails in one or two subjects at the annual examinations, will be required to take supplemental examinations in such subjects.

In case a candidate fails in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure be in only the practical work of a subject he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure be in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the 27th of September, 1904. In other subjects they will be held at the time of the annual examinations.

No candidate will be allowed to enter the fourth year who has not passed his supplemental examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time-table.

### EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, except under such circumstances as may be deemed sufficient by the Council. Application for exemption must be made in writing and the particulars of the case fully stated.

### PRIZE.

The following prize has been established :

Civil Engineering, 3rd Year, \$10 in books. Donor—Mr. T. Kennard Thomson, C.E., New York.

### HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks allotted to the department at the annual examinations.

Papers read before the Engineering Society may be considered in granting Honors.

The Honor list will be arranged alphabetically.

## REGULAR EXAMINATIONS.

## (APPROXIMATE LIST.)

## I Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Algebra.	Magnetism and Electric-
Euclid.	ity ..... 3,5,6.
Plane Trigonometry.	Statics . . . . . 1,2,3,4,5.
Analytical Geometry . . 1,2,3,4,6.	Dynamics . . . . . 1,2,3,4,6.
History of Architecture . . . . 4.	Descriptive Geometry . . 1,2,3,4,6.
Surveying . . . . . 1,2,3,4,6.	Electricity . . . . . 3,5,6.
Chemistry, Elementary.	Heat.
Chemistry, Inorganic . . . . 5,6.	Qualitative Analysis . . . . . 5.
Mineralogy . . . . . 1,2,4,5,6.	

## EXAMINATIONS HELD DURING THE SESSION.

## Drawing

Field Notes ..... 1,2,4.

Architectural Sketches . . . . . 4.

Experimental Physics . . . . . 3,5,6.

Practical Electricity . . . . . 3,5,6.

Practical Chemistry.

Practical Mineralogy ..... 1,2,5,6.

## II Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Calculus . . . . . 1,2,3,4,6.	Chemistry, Inorganic . . . . . 5,6.
Astronomy . . . . . 1.	Chemistry, Organic . . . . . 5,6.
Optics.	Chemistry, Physical . . . . . 5,6.
Strength of Materials . . 1,2,3,4,6.	Chemistry, Applied.
Dynamics . . . . . 1,2,3,6.	Electricity . . . . . 3,5,6.
Theory of Mechanism . . . . 3,6.	Descriptive Geometry . . 1,2,3,4.
Hydrostatics.	Surveying . . . . . 1,2,4.
History of Architecture . . . . 4.	Spherical Trigonometry . . 1,2,3.
Orders of Architecture . . . . 4.	Mineralogy . . . . . 1,2,4,5.
History of Ornament . . . . 4.	Quantitative Analysis . . . . 5.
Lithology . . . . . 2.	Geology . . . . . 1,2,4,5.
Metallurgy.	

1. Civil Engineering.

3. Mechanical and Electrical Engineering.

2. Mining Engineering.

4. Architecture.

5. Analytical and Applied Chemistry.

6. Chemical Engineering.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing .. . . .	1,2,3,4,6.
Field Notes .. . . .	1,2.
Construction Notes .. . . .	1,2,3,4,6.
Architectural Sketches .. . . .	4.
Experimental Physics.	
Practical Electricity .. . . .	3.
Thesis (at beginning of session).	
Practical Chemistry (quali- tative) .. . . .	1,2,3,4.
Practical Chemistry (quanti- tative) .. . . .	2,5,6.
Practical Mineralogy .. . . .	1,2,5.
Practical Lithology .. . . .	2.
German .. . . .	5.

## III Year.

## EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity.3,3'.	Economic Geology .. .1,2,4,5.
Electricity .. . . .1,2,4,5,6.	Theory of Construction 1,2,3,3'.4
Alternating Current .. . . .3'.	Mechanics of Machinery ..3,3'.
Electrical Design .. . . .3'.	Machine Design .. . . .3,3'.
History of Architecture .. . . .4.	Hydraulics .. . . .1,2,3,3',4.
History of Ornament .. . . .4.	Thermodynamics .. . . .1,2,3,3'.
Principles of Decoration .. . . .4.	Descriptive Geometry ..1,2,3,4.
Elements of Design .. . . .4.	Electro-chemistry .. . . .3',6.
Method of Least Squares.1,2,6.	Practical Astronomy and Geo- desy .. . . .1.
Chemistry, Organic .. . . .5.	Surveying and Levelling....1,2.
Chemistry, Physical .. . . .5.	Metallurgy .. . . .2,5.
Chemistry Applied.	Mining and Ore Dressing ...2.
Sanitary plumbing, Heating and Ventilation .. . . .4.	Ore Deposits .. . . .2.
Theory of Compound stress .....1,3,4.	Mill Design .. . . .3.

1. Civil Engineering.

2. Mining Engineering.

5. Analytical and Applied Chemistry.

3. Mechanical and Electrical Engineering.

4. Architecture.

6. Chemical Engineering.

## EXAMINATIONS HELD DURING THE SESSION.

Drawing . . . . .	1,2,3,3',4,6.
Field Notes . . . . .	1,2.
Construction Notes . . . . .	1,3,3',4,6.
Architectural Sketches . . . . .	4.
Experimental Physics . .	1,3,4,5.
Practical Electricity . . . . .	3,3',6.
Thesis (at beginning of session).	
Practical Chemistry . . . . .	2,5.
Determinative Mineralogy . . . . .	2,5.
Assaying . . . . .	2,5.
German . . . . .	5,6.

## DEPARTMENTS.

## CIVIL ENGINEERING.

## I Year.

## MATHEMATICS.

Euclid, algebra plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography.  
Graphics.  
Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.  
Original Surveys.

## CHEMISTRY.

General principles of chemistry.  
Inorganic chemistry.  
Laboratory work.

- 
- |                                      |   |
|--------------------------------------|---|
| 1. Civil Engineering.                | 3. Mechanical and Electrical Engineering. |
| 2. Mining Engineering.               | 4. Architecture.                          |
| 5. Analytical and Applied Chemistry. | 6. Chemical Engineering.                  |

## MINERALOGY.

Introductory course.

Laboratory work.

## PHYSICS.

Heat.

## MECHANICS.

Statics and dynamics (with special reference to structures and machines).

## SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instructions in the use of the transit-theodolite, plotting, mensuration.

## II Year.

## MATHEMATICS.

Differential and integral calculus

Spherical trigonometry.

Plane astronomy.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.



CHEMISTRY.—*Continued.*

Chemical manufacture.

Laboratory work.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Experimental work in engineering laboratory.

Transit-theodolite surveying.

Levelling.

Railway location curves, etc.

Topographic, hydrographic and mining surveying.

## MINERALOGY.

Blowpipe practice.

Determination of minerals.

## GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

## EXPERIMENTAL PHYSICS.

Introductory course.

## VACATION WORK.

See pages 29 and 51.

## III Year.

## DRAWING.

Subjects of previous years continued.

Descriptive geometry—shades and shadows, stone cutting,  
perspective projection.

Original designs—bridges, roofs, floors, arches, etc.

## CHEMISTRY.

Explosives.

Artificial lighting.

CHEMISTRY.—*Continued.*

Photography.

Industrial chemistry.

Sanitary chemistry.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Practical designs—bridges, roofs, floors, arches, retaining walls, foundations, etc.

Thermodynamics and theory of the steam engine.

Hydraulics, sewerage, water supply.

Levelling.

Profiles, cross sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments

Trigonometrical and barometrical levelling.

Geodesy considering the earth a sphere.

Practical astronomy (treated in the manner required for the O.L.S. and D.L.S. examinations).

Least squares.

Electricity.

## GEOLOGY.

Economic geology.

## EXPERIMENTAL PHYSICS.

Heat.

## VACATION WORK.

See pages 29 and 51.

## MINING ENGINEERING.

I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

Analytical plane geometry.

DRAWING.

Copying from the flat, lettering, topography.

Graphics.

Descriptive geometry in its application to plane-sided solids, orthographics (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Inorganic chemistry.

Laboratory work.

MINERALOGY.

Introductory course.

Laboratory practice.

PHYSICS.

Heat.

MECHANICS.

Statics and dynamics (with special reference to structures and machines).

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of the first year continued.

Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures from both copies and original notes.

## CHEMISTRY.

- Advanced chemistry.
- Thermo chemistry.
- Combustion.
- Fuels.
- Chemical manufacture.
- Laboratory work.

## ENGINEERING AND SURVEYING.

- Statics and dynamics (pure and applied).
- Strength and elasticity of materials.
- Transit-theodolite surveying.
- Levelling.
- Railway location, curves, etc.
- Topographic, hydrographic and mining surveying.

## GEOLOGY.

- Elements

## MINERALOGY.

- Blowpipe practice.
- Determination of minerals.
- Lithology.

## METALLURGY.

- Iron and steel

## PHYSICS.

- Hydrostatics.
- Optics.

## EXPERIMENTAL PHYSICS.

- Introductory course.

## VACATION WORK.

- See pages 29 and 51.

## III Year.

## DRAWING.

- Subject of previous years continued.
- Descriptive geometry.

DRAWING.—*Continued.*

Shades and shadows, stone cutting, perspective projection.

Original designs—bridges, roofs, floors etc.

## CHEMISTRY.

Explosives.

Artificial lighting

Photography.

Industrial Chemistry.

Sanitary Chemistry.

Laboratory work.

## ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).

Strength and elasticity of materials.

Theory of construction.

Thermodynamics and theory of steam engine.

Hydraulics.

Experimental work in engineering laboratory.

Levelling.

Profiles, cross-sections, field work and plotting.

Computation of quantities.

Mathematical theory of surveying instruments.

Trigonometrical and barometrical levelling.

Least squares.

Electricity.

## MINERALOGY AND GEOLOGY.

Economic geology.

Palaeontology.

Ore deposits.

Determinative mineralogy.

Metallurgy of gold, silver, nickel, copper, etc.

Mining and ore dressing.

Assaying.

VACATION WORK.

See pages 29 and 51.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

I Year.

**MATHEMATICS.**

Euclid, Algebra, plane trigonometry.

Analytical plane geometry.

**DRAWING.**

Copying from the flat, lettering, graphics.

Descriptive geometry in its application to plane sided solids, orthographic (including isometric), and oblique projection.

**CHEMISTRY.**

General principles of chemistry

Inorganic chemistry.

Laboratory work.

**MECHANICS.**

Statics and dynamics (with special reference to structures and machines).

**SURVEYING.**

Application of trigonometry and principles of measurement (lectures only).

**PHYSICS.**

Heat.

Magnetism and electricity (introductory course).

Electricity (applications of the law of Ohm Kirchhoff and Joule).

**PRACTICAL ELECTRICITY.**

Introductory course.

**EXPERIMENTAL PHYSICS.**

Introductory course.



II Year.

MATHEMATICS.

Differential and integral calculus.  
Spherical trigonometry.

DRAWING.

Subjects of first year continued.  
Coloring and shading applied in constructive drawing.  
Descriptive geometry in its application to solids bounded  
by curved surfaces.  
Machines and structures, (drawings made from both copies  
and original notes.)

CHEMISTRY.

Advanced chemistry.  
Thermo-chemistry  
Combustion.  
Fuels.  
Chemical manufacture.  
Laboratory work.

ENGINEERING.

Statics and dynamics (pure and applied).  
Theory of mechanism.  
Strength and elasticity of materials.  
Materials of construction.  
Methods and processes.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.  
Optics.  
Electrical measurements.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 29 and 51.

**III Year.**

In this year an option is allowed between Descriptive Geometry, Mill Building Design and Compound Stress on the one hand, and Alternating Current, Electrical Design and Electrochemistry on the other. The former is denoted in the time table and elsewhere by 3 and the latter by 3'.

**DRAWING.**

Subjects of previous year continued.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

**CHEMISTRY.**

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

Electro-Chemistry.

**ENGINEERING.**

Subjects of previous year continued.

Applied mechanics.

Mechanics of machinery, machine design, thermodynamics and theory of steam engine, hydraulics.

Electricity.

Direct and alternating current machinery.

Application of principles to practical problems connected with the design, construction and testing of various prime motors and machines.

Experimental work in engineering laboratory.

Mill building design.

**EXPERIMENTAL PHYSICS.**

Terrestrial magnetism.

**ELECTRICAL LABORATORY.****ORIGINAL DESIGNS.**

Engine and machine design.

## VACATION WORK.

See pages 29 and 51.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

## ARCHITECTURE.

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

## DRAWING.

Copying from the flat, lettering, topography, graphics.  
Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.  
Rendering in pencil and pen and ink.

## CHEMISTRY.

General principles of chemistry.  
Inorganic chemistry.  
Laboratory work.

## PHYSICS.

Heat.

## MECHANICS.

Statics (with reference to structures).  
Dynamics (preliminary to the study of hydraulics).

## SURVEYING.

Principles, chain surveying, mensuration.

## MINERALOGY.

Introductory course.

## HISTORY OF ARCHITECTURE.

General introduction.

Ancient architecture.

Egyptian, Assyrian and Persian.

## II Year.

## MATHEMATICS.

Differential and integral calculus.

## DRAWING.

Instrumental drawing, drawing from the cast, sketching  
and water color, pen and ink.

Descriptive geometry (curved surfaces).

## CHEMISTRY.

Advanced chemistry.

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture

Laboratory work.

## MECHANICS.

Statics (pure and applied).

Strength and elasticity of materials.

Materials of construction.

## SURVEYING.

Use of transit and level.

Mensuration.

## MINERALOGY AND GEOLOGY.

Elements.

## METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

HISTORY OF ARCHITECTURE.

Greek and Roman.

Romanesque and Byzantine.

ORDERS AND ELEMENTS OF ARCHITECTURE.

HISTORY OF ORNAMENT.

Ancient.

Classic—Greek, Roman.

VACATION WORK.

See pages 29 and 51.

III Year.

DRAWING.

Descriptive geometry.

Shades and shadows, stone cutting, perspective projection.

Water color sketching.

Original designs—floors, trusses, arches, etc.

CHEMISTRY.

Explosives.

Artificial lighting.

Photography.

Industrial chemistry.

Sanitary chemistry.

THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

Electricity.

Hydraulics.

## SANITARY SCIENCE.

House drainage and plumbing.

Ventilation and heating.

## SURVEYING.

Levelling, setting out excavation, mensuration.

## MINERALOGY AND GEOLOGY.

Economic Geology.

## EXPERIMENTAL PHYSICS.

Heat, acoustics.

## HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

## ELEMENTS OF DESIGN.

Principles of planning with special reference to residences.

Relation between plan and elevations.

## HISTORY OF ORNAMENT.

Early Christian : Gothic and Renaissance.

## PRINCIPLES OF DECORATION.

## VACATION WORK.

See pages 29 and 51.

## ANALYTICAL AND APPLIED CHEMISTRY.

## I Year.

## MATHEMATICS.

Euclid, algebra, plane trigonometry.

## DRAWING.

Copying from the flat, lettering.

Model drawing.

## CHEMISTRY.

General principles of chemistry.

Inorganic chemistry.

Laboratory work.



## MINERALOGY.

Introductory course.

Laboratory work

## PHYSICS.

Heat.

Magnetism and electricity.

## EXPERIMENTAL PHYSICS.

Introductory course.

## ELECTRICITY.

Introductory course.

## II Year.

## CHEMISTRY.

Inorganic chemistry.

Organic chemistry.

Elementary physical chemistry

Applied chemistry.

Laboratory work in quantitative and qualitative analysis.

## MINERALOGY.

Blowpipe practice.

## GEOLOGY.

Physical geography, palaeontology and geology.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics

Optics.

Electricity

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## GERMAN.

## CHEMICAL ENGINEERING.

### VACATION WORK.

See pages 29 and 51.

### III Year.

#### CHEMISTRY.

Organic chemistry.  
Applied chemistry.  
Electro-chemistry.  
Laboratory work.

#### GEOLOGY.

Economic geology.

#### MINERALOGY.

Determinative mineralogy assaying.

#### METALLURGY.

Gold, silver, nickel, copper, lead.

#### BIOLOGY.

#### GERMAN.

### VACATION WORK.

See pages 29 and 51.

## CHEMICAL ENGINEERING.

### I Year.

#### MATHEMATICS.

Euclid, algebra, plane trigonometry.  
Analytical plane geometry.

#### DRAWING.

Copying from the flat, lettering, graphics.  
Descriptive geometry in its application to plane sided solids,  
orthographic (including isometric), and oblique projec-  
tion.

#### CHEMISTRY.

General principles of chemistry.  
Inorganic Chemistry.  
Laboratory work.

## MECHANICS.

Statics and dynamics (with special references to structures and machines).

## PHYSICS.

Heat.

(Magnetism and electricity (introductory course).

Electricity (application of the laws of Ohm Kirchhoff and Joule).

## PRACTICAL ELECTRICITY.

Introductory course

## EXPERIMENTAL PHYSICS.

Introductory course.

## II Year.

## MATHEMATICS.

Differential and integral calculus

Spherical trigonometry.

## DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces.

Machines and structures. (Drawings made from both copies and original notes.)

## CHEMISTRY.

Advanced chemistry.

Thermo chemistry.

Combustion

Fuels.

Chemical manufacture.

Laboratory work.

## ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

ENGINEERING—*Continued.*

Strength and elasticity of materials.

Materials of construction.

Methods and processes.

## METALLURGY.

Iron and steel.

## PHYSICS.

Hydrostatics.

Optics.

Electrical measurements.

## EXPERIMENTAL PHYSICS.

## ELECTRICAL LABORATORY.

## VACATION WORK.

See pages 29 and 51.

## III Year.

## DRAWING.

Subjects of previous year continued.

## CHEMISTRY.

Explosives.

Artificial lighting.

Photography.

Organic chemistry.

Industrial chemistry.

Sanitary chemistry.

## ENGINEERING.

Subjects of previous year continued.

Applied mechanics.

Mechanics of machinery, machine design, thermodynamics  
and theory of steam engine, hydraulics.

Electricity.

Dynamos and motors.

**ENGINEERING—Continued.**

Application of principles to practical problems connected with the design, construction and testing of various prime motors and machines.

Experimental work in engineering laboratory.

**EXPERIMENTAL PHYSICS.**

Magnetism.

**ELECTRICAL LABORATORY.****ORIGINAL DESIGNS.**

Engine and machine design.

**VACATION WORK.**

See pages 29 and 51.

**VACATION WORK.****THESIS AND CONSTRUCTION NOTES.**

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and architectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next annual examination.

**CIVIL ENGINEERING.****SUBJECT OF THESIS FOR SECOND YEAR.**

City Streets and Pavements.

**SUBJECT OF THESIS FOR THIRD YEAR.**

Sewers and Sewerage Systems.

**Books of Reference.**

Byrne—Highway Construction.

Judson—City Roads and Pavements.

Shaler—American Highways.

Spalding—Roads and Pavements.

Rafter and Baker—Sewage Disposal in the United States.

**MINING ENGINEERING.**

**SUBJECT OF THESIS FOR SECOND YEAR.**

Ore Dressing or Mining.

**SUBJECT OF THESIS FOR THIRD YEAR.**

Metallurgy.

**Books of Reference.**

Kuhnhardt—Ore Dressing in Europe.

Ihlseng—Manual of Mining.

Phillips and Bauerman—Elements of Metallurgy.

**MECHANICAL AND ELECTRICAL ENGINEERING.**

**SUBJECT OF THESIS FOR SECOND YEAR.**

Machine Shop practice.

**SUBJECT OF THESIS FOR THIRD YEAR.**

Foundry practice.

**Books of Reference.**

Rose—Practical Machinist.

West—American Foundry Practice.

Spretson—Casting and Founding.

**ARCHITECTURE.**

For the Second year the following set of freehand pencil sketches is required:—

I. Doorway from the object.

II. Staircase.

III. Fireplace with cross section.

And seven sheets from the object, prints, or drawings, with plans and sections where possible.

**SUBJECT OF THESIS FOR SECOND YEAR.**

The above sketches.

**SUBJECT OF THESIS FOR THIRD YEAR.**

Twelve water-color studies.

**ANALYTICAL AND APPLIED CHEMISTRY.**

**SUBJECT OF THESIS FOR SECOND YEAR.**

Sulphuric Acid Manufacture.

**SUBJECT OF THESIS FOR THIRD YEAR.**

Manufacture of Chlorine, Bleaching Powder and Caustic Soda.



**Books of Reference.**

Lunge—Manufacture of Sulphuric Acid and Alkali.

Wagner—Chemical Technology.

Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observation should be given.

**THE FOURTH YEAR.**

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of elective and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an under-graduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions.

- |    |   |  |
|----|---|--|
| A. | { | Astronomy.                                 |
|    |   | Geodesy and Metrology.                     |
|    |   | Architecture.                              |
|    |   | Strength and Elasticity of Materials.      |
| B. | { | Hydraulics.                                |
|    |   | Thermodynamics and Theory of Heat Engines. |
|    |   | Electricity and Magnetism.                 |
|    |   | Industrial Chemistry.                      |
| C. | { | Sanitary and Forensic Chemistry.           |
|    |   | Inorganic and Organic Chemistry.           |
| D. | { | Mineralogy and Geology.                    |
|    |   | Metallurgy and Assaying.                   |

Each student will be required to confine his studies during the session to one of the above groups. He will not be allowed to take less than two or more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Registrar of the school in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students of the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

#### Pass and Honors.

Total marks assigned to fourth year ..... 900

Subdivided as follows:—

Work (reckoned in hours) ..... 540 marks

Records (notes, drawings, etc.) ..... 360 marks

#### FOR PASS:

The minimum percentages are:—

Work, 75 per cent. .... 405 marks

Records, 50 per cent. .... 180 marks

And two-thirds of the total marks assigned ..... 600 marks

#### FOR HONORS:

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration, but no honors will be

granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statute of the University of Toronto respecting the degree of B.A.Sc.

The above certificate will not be granted to students who have been absent without leave of the Council for more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they affect the degree of B.A.Sc.

#### DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a Statute passed by the Senate in 1892, which, with the amendments since made, is as follows:—

**By the Senate of the University of Toronto.**

*Be it enacted:*

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations:

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.
2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.

3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis must be sent to the Registrar not later than the thirty-first day of March, and is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent. and to take honors seventy-five per cent. of the marks assigned.
4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.
- A. { Astronomy.  
Geodesy and Metrology.  
Architecture.  
Strength and Elasticity of Materials.
  - B. { Hydraulics.  
Thermodynamics and Theory of Heat Engines.  
Electricity and Magnetism.  
Industrial Chemistry.
  - C. { Sanitary and Forensic Chemistry.  
Inorganic and Organic Chemistry
  - D. { Mineralogy and Geology.  
Metallurgy and Assaying.

The sub-division "Inorganic and Organic Chemistry" will be obligatory on all candidates who select Group C.

To pass in each subject thirty-three per cent. and to take honors sixty-six per cent of the marks assigned will be required.

5. The degree with honors will be conferred on candidates who obtain three out of the four honors possible, viz.:

Certificates with honors ..... (cl. 2)  
 Thesis with honors ..... (cl. 3)  
 Honors in each subject of examination ..... (cl. 4)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual or supplemental examinations an application for examinations according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in April, and the supplemental examinations in September.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the day preceding the first day of the examination.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis, drawings, and other papers accompanying them, shall be the property of the School of Practical Science.
11. In case any change shall be made in the conditions referred to in the second clause, such change shall be admitted to the Senate, and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

### SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896:

**By the Senate of the University of Toronto.**

*Be it enacted:*

- I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.
- II. That the following degrees be hereby established, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.).
- III. That the following be the conditions and regulations governing the conferring of the said degrees.



1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause II hereunder.
2. He shall have spent at least three years after receiving the degree Bachelor of Applied Science in the actual practice of the branch of Engineering wherein he is a candidate for a degree.
3. Intervals of non-employment or of employment in other branches of Engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.
4. Satisfactory evidence shall be submitted to the University examiners as to the nature and length of the candidates' professional experience for the purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.
5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree ; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidates may be required at the option of the Examiners to undergo an examination in the subject of this thesis.
6. Notice in writing shall be sent to the Registrar not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis for the approval of the Senate.
7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the first day of April.



8. The candidate shall be required to present himself for examination in the month of April at such time as may be arranged by the Registrar.
9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.
10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the School of Practical Science.
11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.  
For further particulars apply to the Registrar of the University of Toronto.  
For the better carrying out of the provisions of the above statute the following statute constituting the Board of Examiners for professional degrees in Engineering was passed by the Senate on December 14th, 1900.  
By the Senate of the University of Toronto—

Be it enacted:

1. That the Examiners for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), and Electrical Engineer (E.E.), be appointed at least twelve months in advance of the date of the examinations for which their services are required.
2. That the said Examiners constitute the Board of Examiners for degrees in Engineering.
3. That the members of the Board shall select one of their number to act as chairman within one month from the date of their appointment.
4. That candidates for examination applying to the Registrar for information respecting the nature or details of the examinations for the said degrees, shall be directed by him to communicate with the chairman of the said Board, who shall forward to the candidates either directly or through the Registrar the decision of the Board.

5. That the Chairman of the said Board shall keep a record book in which he shall enter the minutes of the proceedings of the Board. He shall also keep a file in book form of all correspondence with candidates for examination and other official correspondence; and shall at the close of the examinations transmit to the Registrar a copy of the said minutes and correspondence.
6. That at the close of the examinations, the Board shall forward a report of the results to the Registrar for transmission to the Senate. The report shall be signed by the Examiners or by the Chairman of the Board on their behalf.
7. That the Registrar shall furnish each Examiner on his appointment with a copy of this statute and a copy of the statute respecting degrees in Engineering.

**Extract from the Provincial Act Respecting Land Surveyors and Survey of Lands. (R.S.O.)**

"10—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practicing Ontario Land Surveyor.

"14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examinations hereinbefore required for admission to appren-

ticeship with a land surveyor, but shall only be required to serve under articles with a practicing land surveyor duly filed as required by section 17 of this Act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his examination may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such course of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practicing Ontario Land Surveyor."

#### **Extract from the Dominion Lands Act.**

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Dominion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one year's service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the candidates for the Diploma of D.T.S. given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.

## Extract from The Ontario Architects Act.

"Any student who has matriculated in Arts in any University in His Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

"23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

"24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

"(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to be a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Registrar upon payment of such fees as the council may by regulation direct."

## SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

### Subjects Taught by the Faculty of the School.

Subjects.	Instructors.
Organic and Inorganic Chemistry, Applied Chemistry, Assaying.	<div> W. H. Ellis, M.A., B.A., Professor.  J. W. Bain, B.A.Sc., Lecturer.  E. G. R. Ardagh, B.A.Sc., Fellow.  C. G. Williams, Grad. S.P.S., Fellow. </div>
Geology, Metallurgy, Mining and Ore-dressing, Milling, German,	<div> A. P. Coleman, M.A., Ph. D.,  Professor.  G. R. Mickle, B.A., Lecturer.  J. G. McMillan, B.A.Sc., Fellow. </div>

## SYNOPSIS OF LECTURES, ETC.

### Subjects Taught by the Faculty of the School.—Continued.

Dynamics,	}	J. Galbraith, M.A., LL.D., Professor.
Strength of Materials,		J. McGowan, B.A., B.A.Sc., Lecturer.
Theory of Construction.		R. W. Angus, B.A.Sc., Lecturer.
Machine Design,		H. G. McVean, B.A.Sc.,
Theory of Mechanism,		Demonstrator.
Compound Stress,		
Hydraulics,		
Thermodynamics, and Theory of the		
Steam Engine,		
French.		
Statics,	}	C. H. C. Wright, B.A.Sc., Professor.
Drawing,		J. R. Cockburn, B.A.Sc., Fellow.
Architecture,		S. B. Wass, Grad., S.P.S., Fellow.
Plumbing, Heating and Ventilation,		A. E. Davison, Grad., S.P.S., Fellow.
Mortars and Cements,		
Brick and Stone Masonry.		
Surveying,		
Geodesy and Astronomy,		L. B. Stewart, D.T.S., Professor.
Spherical Trigonometry,		J. L. R. Parsons, B.A., Fellow.
Least Squares,		
Descriptive Geometry.	}	
Electricity,		T. R. Rosebrugh, M.A., Professor.
Magnetism,		H. W. Price, B.A.Sc., Demonstrator.
Dynamo-Electric Machinery,		H. M. Shipe, Grad. S.P.S., Fellow.
Mechanics of Machinery.		

### Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy.	Alfred Baker, M.A., Professor. A. T. DeLury, B.A., Associate Professor. J. C. Fields, B.A., Ph.D., Lecturer. L. K. File, B.A., Asst. Lecturer. James Loudon, M.A., LL.D., Professor. W. J. Loudon, B.A., Associate Professor. C. A. Chant, M.A., Lecturer. J. C. McLennan, B.A., Ph.D., Associate Professor. F. R. Burton, B.A., Assistant Demonstrator. R. Ramsey Wright, M.A., LL.D., Professor. W. R. Lang, D.Sc., Professor. T. L. Walker, M.A., Ph.D., Professor. W. L. Miller, B.A., Ph.D., Associate Professor. W. Parks, B.A., Ph.D., Lecturer. F. B. Kenrick, M.A., Ph.D., Lecturer. F. B. Allan, M.A., Ph.D., Lecturer. M. T. Culbert, B.A.Sc., Class Asst. H. L. Kerr, B.A., Class Assistant.
Sound, Light, Heat, Electricity and Magnetism, Hydrostatics.	
Biology, Mineralogy, Petrography, Chemistry.	



**DRAWING.**

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry (plane and solid); orthographic, oblique and perspective projections; intersection of surfaces, shades and shadows, stone cutting, theory of mechanism. theory of mapping, etc.

**Text Books and Books of Reference.**

Angel—Plane and Solid Geometry.

Binn—Orthographic Projection.

Church—Descriptive Geometry (a) (b).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draughtsmen, Engineers and Students, (b), (c).

Vere Foster—Copy Book No. 10 (a).

Warren—Stone Cutting (c).

Worthen—Topographical Drawing.

**SURVEYING AND LEVELING.****LAND SURVEYING.**

Chain Surveys.

Compass and theodolite surveys.

Method of keeping field notes.

Determination of heights and distances.

Plotting.

**LEVELLING.**

Longitudinal and cross sections.

Plotting.

**SETTING OUT.**

Setting out straight lines and curves.

Setting out levels.

**MENSURATION.**

Lines, Surfaces and solids.

Timber, masonry, iron and earthwork.

Capacity of reservoirs, etc.



Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

#### Text Books.

Brough—Mine Surveying (b), (c).

Gillespie—Higher Surveying (b), (c), (d).

Henck or Searle—Railway Curves (b), (c).

Johnson—Theory and Practice of Surveying.

Murray—Manual of Land Surveying (a).

### PRACTICAL ASTRONOMY AND GEODESY.

#### ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map construction are based upon supposition that earth is a sphere.

#### ADVANCED COURSE (Fourth Year).

The work of this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyors.

It is distinguished from the work of the ordinary course not so much by the subjects as by the degree of refinement to which the investigations are carried.

In geodesy the earth is considered a spheroid.

#### Text Books.

Chauvenet—Spherical and Practical Astronomy.

Doolittle—Practical Astronomy.

Gillespie—Higher Surveying (b), (c), (d).

Gore—Elements of Geodesy (c), (d).

Green—Spherical and Practical Astronomy (c), (d).

Helmert—Hohere Geodasie.

Nautical Almanac, 1905 (c), (d).

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First year text-books (a), Second year (b), Third year (c), Fourth year (d).

## APPLIED MECHANICS.

## STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

## THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

## THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—arches, retaining walls, roofs, bridges, etc.

## DYNAMICS.

Representation and measurements of forces and motions.

Principles of work and energy.

Efficiency of machines. Friction.

Transmission of energy—belts, shafts, crank and connecting rod, etc.

Fly-wheels, governors.

Balancing of machinery, etc., etc.

## STRENGTH OF THE PARTS OF MACHINES.

## MACHINE DESIGN.

## HYDRAULICS.

Discharge of water through orifices, notches, etc. Flow in pipes and open channels. Sewerage, water-works, water-power, water-wheels, turbines, pumps, etc.

## THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

## Text Books and Books of Reference.

Baker—Masonry Construction (d).

Billings—Heat and Ventilation.

Bodmer—Hydraulic Motors, Turbines, etc. (d).

Carnegie Pocket Companion.

Carpenter—Heating and Ventilation of Buildings (c).

Carpenter—Experimental Engineering (d).

Du Bois—Graphic Statics.

Du Bois—Strains in Frames Structures.

- Foster—Electrical Engineers' Pocket Book.
- Gerhardt—House Drainage and Sanitary Plumbing (c).
- Greene—Trusses and Arches.
- Innes—Centrifugal Pumps, Turbines and Water Motors (d).
- Johnson—Modern Framed Structures (c), (d).
- Johnson—Materials of Construction (d).
- Kennedy—Mechanics of Machinery (b), (c).
- Kent—Mechanical Engineer's Pocket Book.
- Kidder—Building Construction and Superintendence.
- Kidder—Architect and Builder's Pocket Book.
- Lanza—Applied Mechanics.
- Low and Bevis—Machine Drawing and Design (b), (c).
- Low—Machine Drawing (a), (b), (c).
- Merriman and Jacoby—Roofs and Bridges.
- Merriman—Mechanics of Materials (b), (c), (d).
- Merriman—Hydraulics (c), (d).
- Patton—Foundation (d).
- Peabody—Thermodynamics (d).
- Peabody—Steam Tables (d).
- Rafter and Baker—Sewage Disposal in the United States.
- Rankine—Applied Mechanics (c), (d).
- Reuleaux—The Constructor.
- Santo Crimp—Sewage Disposal Works.
- Shann—Elementary Treatise on Heat (c), (d).
- Trautwine—Engineer's Pocket Book.
- Unwin—Elements of Machine Design (c).
- Unwin—Testing of Materials of Construction.
- Von Ott—Graphic Statics (a).
- Williamson—Elasticity (d).

### THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links, bands and pulleys, hydraulic connections, frictional gearing, ling motion for slide valves, etc.

**Text Books and Books of Reference.**

Auchincloss—Valve and Link Motions (c).

Goodeve—Elements of Mechanism (b).

Halsey—Slide Valve Gears.

Kennedy—Mechanics of Machinery (b), (c).

Rankine—Machinery and Millwork.

Reuleaux—Kinematics of Machinery.

**ELECTRICITY.**

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises :—

**ELEMENTARY ELECTRICITY AND MAGNETISM.****MEASURING INSTRUMENTS.**

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

**MATHEMATICAL THEORY OF ELECTRICITY.****APPLICATIONS OF ELECTRICITY.**

Laboratory work and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

**THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.****Text Books and Books of Reference.**

Bedell and Crehore—Alternating Currents.

Carhart and Patterson—Electrical Measurements (b), (d).

Bedell—Principles of the Transformer (d).

Fleming—Alternate Current Transformers, Vols. I. and II. (d).

Jackson—Electromagnetism and the Construction of Dynamos (c).

Kempe—Electrical Testing (b).

Loudon and McLennan—Practical Physics (b).

Stewart and Gee—Practical Physics.

Thompson, S. P.—Elementary Electricity and Magnetism.

Thompson, S. P.—Dynamo Electric Machinery.

Thompson, S. P.—Polyphase Currents.

Wiener—Dynamo Electric Machines.

## ARCHITECTURE.

### HISTORY OF ARCHITECTURE.

Egyptian, Assyrian and Persian.

Classic.

Romanesque and Byzantine.

Gothic.

Renaissance.

### ORDERS OF ARCHITECTURE.

### HISTORY OF ORNAMENT.

### PRINCIPLES OF DECORATION.

#### Text Books and Books of Reference.

Fergusson—History of Architecture.

Fletcher—A History of Architecture.

Gwilt—Encyclopaedia of Architecture.

Leeds—Orders of Architecture (b).

Osborne—Art of House Planning (d).

Owen Jones—Grammar of Ornament.

Racinet—L'Ornement Polychrome.

Rickman—Gothic Architecture.

Sharpe—Seven periods of Church Architecture.

Smith, T. Roger—Classic and Early Christian Architecture (a), (b).

Smith, T. Roger—Gothic and Renaissance (c).

Stratham—Architecture for General Readers.

Sturgis—European Architecture.

Vignole—The Five Orders of Architecture (b), (c).

### MATHEMATICS AND PHYSICS.

The pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathematics is taught partly in the University and partly in the school.

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First year text-books (a), Second year (b), Third year (c), Fourth year (d).

**Text Books and Books of Reference.**

Ganot—Physics (b).

Hall and Knight—Plane Trigonometry (a).

Loomis—Calculus (b).

Loudon and McLennan—Practical Physics (b).

Mackay—Elements of Euclid (a).

Newcombs and Holden—Astronomy (b).

Osborne—Calculus.

C. Smith—Conic Sections (a).

Hamblin Smith—Hydrostatics (b).

Balfour Stewart—Heat.

Todhunter—Algebra (a).

Todhunter—Spherical Trigonometry (b).

Tyndall—Sound.

**CHEMISTRY.****COURSES IN THE SCHOOL OF PRACTICAL SCIENCE:**

Inorganic and organic chemistry.

Applied chemistry.

The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.

Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

**COURSES IN THE UNIVERSITY OF TORONTO:**

Organic chemistry.

Chemical theory.

Physical chemistry.

**Text Books and Books of Reference.**

Allen—Commercial Organic Analysis.

Arnold—Steel Work Analysis.

Beilstein—Organic Chemistry.

Beringer—Text Book of Assaying.

Blair—Chemical Analysis of Iron and Steel.

Blount—Electro-Chemistry.

Bloxam—Chemistry.

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First year text-books (a), Second year (b), Third year (c), Fourth year (d).



- Bloxam and Blount—Chemistry for Engineer and Manufacturers.  
Blyth, A. W.—Poisons.  
Blyth, A. W.—Foods.  
Bolley—Handbuch der Chemischen Technologie.  
Dammer—Handbuch der Anorganischen Chemie.  
Douglas and Johnston—Qualitative Analysis.  
Fresenius—Qualitative and Quantitative Analysis.  
Furman—Manual of Practical Assaying.  
Hempel—Gas Analysis.  
Holleman—Inorganic Chemistry.  
Jones—Practical Chemistry.  
Lord—Notes on Metallurgical Analysis.  
Lunge—Sulphuric Acid and Alkali.  
Lunge—Coal Tar and Ammonia.  
Meyer—History of Chemistry.  
Miller and Smale—Qualitative Analysis.  
Morgan—Elements of Physical Chemistry.  
Newth—Manual of Chemical Analysis.  
Ostwald—Lehrbuch der Allgemeinen Chemie.  
Ostwald—Outlines of General Chemistry.  
Ostwald—Principles of Inorganic Chemistry.  
Pattison Muir—Thermo-chemistry, elements of.  
Perkin—Qualitative Analysis.  
Perkin and Kipping—Organic Chemistry.  
Poole—Calorific value of Fuels.  
Post—Chemisch-technische Analyse.  
Remsen—Inorganic and Organic Chemistry.  
Richter—Inorganic and Organic Chemistry.  
Roscoe and Schorlemmer—Treatise on Chemistry.  
Sadtler—Organic and Applied Chemistry.  
Sutton—Volumetric Analysis.  
Thorp—Outlines of Industrial Chemistry.  
Thorpe—Dictionary of Applied Chemistry.  
Thorpe—Quantitative Analysis.  
Treadwell—Lehrbuch der Analytischen Chemie.

- Wagner—Chemical Technology.  
Walke—Lectures on Explosives.  
Watt—Dictionary of Chemistry.  
Wiechman—Sugar Analysis.  
Winkler—Gas Analysis.

## MINERALOGY, GEOLOGY AND METALLURGY.

### 1. Mineralogy and Geology.

- Mineralogy and crystallography.
- Geology and palaeontology.
- Petrography.
- Physical geography.
- Blowpipe analysis.
- Determinative mineralogy.

### 2. Mining and Metallurgy.

- Mining Geology.
- Ore dressing.
- Metallurgy of iron and steel.
- Metallurgy of gold, silver, copper, nickel, etc.
- Assaying.
- Milling.

### Text Books and Books of Reference.

- Chapman or Brush—Mineral Tables.  
Chapman—Mineralogy and Geology of Canada.  
Crosby—Determination of Minerals.  
Dana—Manual of Geology.  
Dana—Minerals and how to study them.  
Dana—Text books of Mineralogy.  
Furman—Assaying.  
Geikie—Text-Books on Geology.  
Harker—Petrography for Students.  
Howe—Metallurgy of Steel.  
Ihlseng—Manual of Mining.  
Kemp—Handbooks of Rocks.  
Kemp—Ore Deposits of the United States.

Kuhnhardt—Ore Dressing.

Nicholson—Palaeontology.

Peters—Modern Copper Smelting.

Phillips—Ore Deposits.

Phillips and Bauerman—Elements of Metallurgy.

Plattner—Manual of Blowpipe Analysis.

Roberts-Austen—Metallurgy.

Rose—Metallurgy of Gold.

Rosenbusch—Petrography.

### THERMODYNAMIC LABORATORY.

Thermodynamic laboratory contains a 50-horse power Brown engine. The engine was constructed especially for experimental investigations, and the cylinder has steam jackets on the body and both ends, arranged so that any or all of them may be used at once, or that all may be shut off as desired. The exhaust steam may be passed through a feed-water heater to the open air, or to a jet condenser or to a Wheeler surface condenser, the latter of which was kindly presented to the School by the inventor, Mr. F. M. Wheeler, of New York.

A De Laval turbine has also been placed in the laboratory, and is arranged with two alternative exhausts, directly to the atmosphere and to a surface condenser, suitable nozzles being provided for either purpose.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, which was a gift of the manufacturers. Several injectors of various types are also available for experimental work and examination.

The steam for the plant is supplied by a Babcock & Willcox boiler, and a Harrison-Wharton boiler.

An Otto gas engine completes the experimental equipment of this laboratory. There are, in addition, the usual measuring instruments required in thermodynamic investigations, among which may be mentioned, indicators of various types, gauges, gauge testing apparatus, calorimeters, both throttling and separating, scales, brakes, dynometers, anemometers, thermometers, a platinum and platino-rhodium thermo-couple, and other instruments.

## HYDRAULIC LABORATORY.

This laboratory contains two large steel tanks arranged for the experimental study of the flow of water through orifices and over weirs. Both orifices and weirs may be conveniently changed.

The discharge is measured by two tanks which are filled and emptied alternately by means of four valves operated by a single lever, thus enabling the measuring to be continued for any length of time without interrupting the flow.

The water is supplied by a three-throw pump with double acting cylinders, having a capacity of 500,000 gallons per 24 hours.

For the work on turbines, etc., a six-inch new American turbine, the gift of the firm of William Kennedy & Sons, Owen Sound, has been set up so that efficiency determinations under different gate openings and heads may be made. In addition to this a thirty-six inch axial impulse turbine, and a Pelton wheel, each being provided with suitable brakes, means of accurately measuring the discharge continuously, and other requirements for experimental work. There are also three centrifugal pumps, one made by the Morris Machine Works, another which has been kindly presented to the School by the Northey Co., Limited, Toronto, the manufacturers, and a third which has been specially designed and built for a more careful line of experimental work than is possible with the ordinary commercial pump of this class. A dynamometer and other necessary apparatus are provided for adapting these pumps to scientific investigations.

A Venturi meter has also been installed, and apparatus has been arranged so that the discharge from different forms of nozzles, and the frictional losses in elbows, valves, etc., may be determined.

There are the usual measuring instruments, gauges, gauge-testing apparatus, scales, brakes and dynamometers, and a nine-inch McCormick turbine.

## STRENGTH OF MATERIALS LABORATORY.

The machines in this department are the following :

An Emery 50-ton machine, built by William Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression,

shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 10-ton universal testing machine.

An Olson torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity adapted to specimens up to 48 inches in length.

A Riehle abrasion machine, for testing the resistance to attrition of stones, brick, etc.

Extensometers of the Bauschinger, Unwin, Marshall and other types, besides a large number of micrometers and scales.

The shop is equipped with a number of high-class machine tools specially fitted for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs and for making special apparatus for original investigation.

### CEMENT TESTING LABORATORY.

This department is fitted with all the usual moulds, gravimeters, tables and tank accommodation necessary in a well equipped laboratory.

In this laboratory there are also the following :

A Riehle 2,000 pounds machine, fitted for either tension or compression.

A Riehle 600-pounds machine fitted for tension only.

An extra large Faija's hot bath apparatus.

### METROLOGICAL LABORATORY.

In the geodetic and astronomical departments are a 100-foot and a 66-foot standard of length ; a 10-foot Rogers comparator with a graduating attachment ; a Kater's pendulum with a vacuum chamber ; a Howard astronomical clock and electro-chronograph ; a sidereal chronometer, a zenith telescope, a Troughton & Simms 10-inch theodolite, a level trier, thirteen surveyor's transits, ten levels, compasses, sextants, plane tables, micrometers, planimeters, etc.; and all the necessary field instruments.



## ELECTRICAL LABORATORY.

In one section of this laboratory a 20 kilowatt Edison motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, a Westinghouse experimental alternator, and a rotary converter when used as a polyphase dynamo. Of direct current motors, besides the one already mentioned, there are a Crocker-Wheeler machine and a 6 h.p. Edison motor, used in the mill-room, but available for testing; besides fan motors. Of alternating current motors there are a General Electric three-phase induction motor and a single-phase induction motor with condensor compensator, besides a special experimental polyphase induction motor of 7 1-2 h.p., by the same company, in which the rotor terminals are all separately accessible. A revolving field for the latter machine makes it a general form of polyphase generator. There are also a Wagner single phase induction motor and a G.E. constant current transformer with a series of six arc lamps. Other types are represented by fan motors. A marble switchboard in this room facilitates connection between different circuits, both locally and for other parts of the building. It is supplied with 110 and 220 volts, direct current, and the same voltage of alternating current of sixty cycles from the city circuits, in addition to the range of supply that may be had from our own generators and storage cells. Four switches which may be connected in any of the circuits, two sets of bus-bars for paralleling, automatic circuit breakers, arc and incandescent lamp circuits; and controlling rheostats are also connected to the switchboard.

Another section is the galvanometer room, in which are ten masonry piers to support instruments in such a way as to be free of vibration.

An adjoining room is the laboratory for advanced work, in which may be mentioned a Kelvin Balance and its rheostat, and an enclosure within which experiments with high voltages may be safely performed. Marble switchboards are placed in this room, and in the galvanometer room to connect with "Chloride" storage batteries of large and small cells located on a gallery in a separate room, and apparatus for convenience in standardizing measuring instruments is available.



Among the instruments and apparatus may be mentioned: Numerous D'Arsonval galvanometers of Carpentier, Rowland and other designs, ballistic galvanometers, a Thomson galvanometer, telescopes and scales, divided microfarad condenser, Kempe discharge key, rheostats and proportional arms for Wheatstone bridge and other purposes, slide wire metre bridges, including special bridge for electrolytic resistance; standard resistances, including megohm, 10 ohms, several copies of the ohm, divided ohm, and a complete set of standard from one hundred thousand ohms down to one-thousandth ohm, certified copies of the ohm, divided ohm, and a complete set of standards from by the Charlottenburg Reichsanstalt, the latter with oil bath and stirrer; Willyoung potentiometer, standard cells, Clark and Helmholtz, Kohlrausch tubes for measurement of electrolytic resistance, Lippmann electrometers, Kelvin-Mascart electrometer, Nernst electrometer. Besides these are numerous Weston instruments, including wattmeters, voltmeters for direct and alternating current, ammeters and milliammeters, Thomson and Whitney ammeters and voltmeters, three Siemens electrodynometers, Kelvin balance, Kelvin high potential electrostatic voltmeter, and electrostatic multicellular voltmeter; Thomson recording wattmeters (including one for three phase), Shallenberger recording ammeter; lightning arresters, Westinghouse, Stanley, Wagner and Thomson-Houston transformers; a General Electric 10,000 volt testing transformer, and a low voltage 1,000 ampere transformer, high potential condenser, Wimshurst influence machine, Ruhmkorff coils, Crookes' tubes, fluoroscope, Braun tube, wireless telegraph apparatus; Hopkinson permeameter for testing the magnetic qualities of iron, instruments for measuring instantaneous current and voltage in alternating current circuits according to Duncan, Fessenden contact maker, earth inductor, Ayrton and Perry secohmmeter, fixed and variable standards of inductance, double sets of telegraph and telephone apparatus; Lummer-Brodhun and Bunsen photometers with accessories for arc and incandescent light photometry and Hefner standard amyl-acetate lamp. Voltmeters of all the usual forms, balances, thermometers, portable rheostats and numerous minor appliances complete this portion of the equipment. Among the arc lights may be mentioned the Manhattan, Upton, Adams-Bagnall, Tarring, Thomson, Safford and United Electric long burning enclosed

arcs, Thomson and other lamps for alternating current, the Ward and Universal (two in series of 110 volt circuits). Thomson Houston and Ball for series circuits and one the gift of W. A. Turbayne.

### MINERALOGICAL LABORATORY.

This laboratory contains a collection of hand specimens of minerals and rocks for the purpose of training students in handling and becoming familiar with the more common varieties of both; accommodation is also provided for instruction in blowpipe analysis.

### ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two Brown coke furnaces for crucibles and muffles, two pulverizers, a muller, and all other necessary appliances for pulverizing and preparing ores for fire assay. The pulp balances for weighing charges and the delicate balances for weighing gold and silver buttons are kept in a room opening off the assay laboratory. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope; also the necessary appliances for making rock sections by hand. Six petrographical microscopes are reserved for the use of advanced students in lithology.

### MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silver copper plates, and a Frue Vanner. The concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse power Edison motor, which is supplied with current from the city circuit. The mill room is also provided with settling tanks for the tailings and concentrates, a pair of Hamilton rolls for dry crushing, and an automatic sampler.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill-room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a large brick assay furnace, and a reverberatory furnace for roasting sulphide and arsenical ores; leaching vats for treating ores by the cyanide process, and a chlorination barrel.

### CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratory will accommodate about twenty students. It is furnished with convenient work tables, and fume cupboards, and supplied with the most recent apparatus for gravimetric, volumetric and gasometric analysis, both scientific and technical. Besides balances by the best makers, and of the most recent construction, furnaces for fusion, organic analysis, etc., and all the requisites for the assays of ores, furnace and other technical products in the wet way, the apparatus includes an experimental vacuum pan, a filter press, the latest forms of Fischer's, Mahler's, Junker's and Carpenter's apparatus for the determination of the heating power of fuel, facilities for the electrolytic determination of metals, including a Gulcher thermo-electric pile; spectrosopes, polarscopes and microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying.

In addition to these is also a laboratory for gas analysis and calorimetric work.

### PHYSICAL LABORATORY.

University of Toronto.

The physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat, and

electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

### MUSEUMS.

The Geological Museum includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the specimens known in the Province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to, and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive schistose and sedimentary rocks; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The palaeontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made towards arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

## LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference in the subjects of study pursued in the school has been formed, and is being added to year by year.

## List of Donors to the Library.

American Society of Civil Engineers—Proceedings.

Association of Engineering Societies—Journal.

Blackwood, A. E.—Stone.

Bureau of Mines—Report.

Canadian Mining Institute—Journal.

Columbian University—Quarterly.

Department of Mines, Nova Scotia—Report.

Geological Survey of Canada—Report.

Gzowski, Estate of the late Sir Casimir—

Transactions of American Society of Civil Engineers, 1874-1898.

Transactions of Canadian Society of Civil Engineers, vol. I., 1877—vol. XII., 1898.

Proceedings of The Institution of Civil Engineers, vol. LXIII., 1880—vol. CXXXII., 1898.

Institution of Engineers and Shipbuilders in Scotland—Transactions.

Institution of Junior Engineers—Transactions.

Institution of Mechanical Engineers—Proceedings.

Royal Institute of British Architects—Journal and Proceedings.

Society of Chemical Industry—Journal.

Societe des Ingenieurs Civils de France—Memoires.

United States Coast and Geodetic Survey—Report.

United States Government Tests of Metals, etc.—Report.

University of Toronto—Studies.



# THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

Officers for 1904 05.

President .. . . .	E. A. James.
Vice-President .. . . .	Wm. Treadgold, B.A.
Recording Secretary ...	C. W. Graham.
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Third Year Representative ....	G. W. Rayner.
Second Year Representative ...	J. J. Beeman.
First Year Representative ....	To be elected.

The Society meets every second Wednesday during the Academic Year. Papers are read, and discussions are held on engineering subjects. The Society publishes a pamphlet annually, containing the best papers read at the meetings.

## GYMNASIUM AND ATHLETIC GROUNDS.

(From the Calendar of the University of Toronto.)

"The University gymnasium was completed and equipped in 1893. It is fully provided with the best and most modern appliances for physical culture, and contains a running track, shower baths and swimming bath, besides the necessary dressing rooms and other conveniences. A competent instructor in gymnastics is in constant attendance to superintend and direct the exercises of students. In addition to the lawn in front of the Main University Building and a campus in the rear, a large plot of ground on Devonshire Place has been set apart as an athletic field. By this addition the facilities for football, cricket, tennis and other out-door athletic sports are doubled, as compared with previous accommodation; and by these grounds, in conjunction



with the gymnasium, ample opportunity is afforded to all students for healthful exercise and physical development. To assist in meeting the expenses of the gymnasium, a nominal annual fee is imposed on those who avail themselves of its advantages. The supervision of all athletic matters has been intrusted by the Councils to an Athletic Board, consisting of six members appointed from the Faculty and officers of the Athletic Association. All applications of clubs for the use of grounds must be made annually to this Board. All such applications must be accompanied by a list of officers. In the case of new clubs the list of officers must be accompanied by particulars as to the organization and objects of the club making application.

### UNIVERSITY OF TORONTO ATHLETIC ASSOCIATION.

#### Directorate.

(From the Calendar of the University of Toronto.)

Pres.—President Loudon, LL.D.

Vice-Pres.—H. Carveth.

Sec.-Treas.—S. P. Biggs.

Dir.—Professor McCurdy.

Dir.—Rev. D. B. Macdonald.

“ Prof. C. H. C. Wright.

“ W. Greig.

“ T. W. Graham, B.A.

“ A. Snively.

“ R. Pearson.

“ W. G. Wood.

The athletic association is now the paramount body in University Athletics, and has entire jurisdiction over the athletic clubs using the University name, and over their finances, members, and policy, subject to the University authorities. Henceforth no financial agreement can be entered into by any such club without the sanction of the Directorate. No expenditure of any kind in connection with any such club can be made without the written order of the Secretary-Treasurer of the Directorate.

### STUDENTS' UNION BUILDING.

(From the Calendar of the University of Toronto.)

“In 1894, additions were made to the front of the building in which the Gymnasium is situated, consisting of a large hall for public meetings, a reading room and committee rooms. This additional ac-

commodation is available for the work of the various student societies and for academic purposes. Applications for the use of rooms, accompanied by a list of officers and a copy of the constitution of the society making application, must be made, through the President, to the joint committee of the Councils on Gymnasium and Students' Union Building, at the beginning of the season, or from time to time as occasion requires. Arrangements have also been made by which recognized societies may obtain the use of committee-rooms on application to the janitor of the Students' Union Building.

### SCHOOL OF PRACTICAL SCIENCE ATHLETIC ASSOCIATION.

#### Executive Committee, 1904-05.

Honorary President...	J. Galbraith, LL.D.
President...	W. R. Worthington.
Vice-President...	W. G. Swan.
Secretary-Treasurer...	J. M. Gordon.
IV. Year Representative...	F. W. Burnham.
III. " " ...	F. C. Broadfoot.
II. " " ...	W. Blackwood.
I. " " ...	To be elected.

The athletic association is the ruling body in School athletics, and has full control over all athletic clubs using the School name. The Executive Committee has power to suspend any one from the privileges of membership in the association for any breach of its regulations, and controls the finances of all athletic clubs in the School. The annual membership fee of this association is fifty cents.

No other monies are collected for the support of athletics in the School without the sanction of the Executive Committee.

### RUGBY FOOTBALL.

The Mulock Cup, which was presented by Hon. Wm. Mulock, M.A., LL.D., to the University of Toronto Rugby Foot-ball Club for inter-college competition, brings out each year a large number of contestants from the University and affiliated colleges.

## Rugby Football Club of the School of Practical Science.

## OFFICERS.

Hon. President.. . . . .	Principal Galbraith.
President.. . . . .	C. L. Coulson.
Sec.-Treas..... . . . .	L. W. Morden.
Manager of senior team . . . . .	P. M. Sauder.
Captain of senior team... . . . .	C. J. Ingles.
Manager of junior team... . . . .	F. A. McGiverin.
Captain of junior team.. . . . .	W. H. Bevan.

## LIST OF PLAYERS.

## SENIOR TEAM.

Bryce, R. A.	Pattee, L. F.
Coulson, C. L.	Parke, J.
Fletcher, H. M.	Robinson, L.
Gordon, J. M.	Rutherford, F. N.
Gzowski, H. N.	Sauder, P. M. (Mgr.)
Ingles, J. (Capt.)	Wallace, W. W.
Montague, F. F.	Wilkie, J. H. N.
Morden, L. W.	

## JUNIOR TEAM.

Acton, C. S.	Hall, K.
Beck, W. F.	McGiverin, F. A. (Capt.)
Bevan, W. H.	McKenzie, J. A.
Christie, F.	Power, C. W.
Connery, F.	Ritchie, H. C.
Fletcher, W.	Rogers, C. H.
Frost, E. A.	Ross, K. G.
Grasett, C. S.	

## ASSOCIATION FOOTBALL.

In order to encourage Association Football on the College Campus, the Faculty of the University of Toronto presented a cup, known as the Faculty Cup, to the Inter-College Association Football Club for annual competition among the University and affiliated colleges.

## Association Football Club of the School of Practical Science.

## OFFICERS.

Hon. President . . . . .	Prof. L. B. Stewart, D.T.S.
President.. . . . .	J. A. MacFarlane.
Sec.-Treas..... . . . .	J. M. MacInnes.
Manager Seniors . . . . .	H. L. Chilver.
Manager Juniors.... . . . .	W. C. Jepson.

## LIST OF SENIOR PLAYERS.

Winners of Faculty Cup and Ontario Championship.

Beeman, J. J.	MacInnes, J.
Blackwood, W.	MacKenzie, W. D.
Cook, A. B.	Patten, B. B.
Dowling, F. F.	Ross, C. H.
Heron, J. B.	Rutherford, F. N. (Capt.)
Johnson, C.	Swan, W. G.
McDonald, L. C.	

## LIST OF JUNIOR PLAYERS.

Winners of Junior Series.

Bishop, W. J.	MacKenzie, D. W.
Brian, M. E.	Miller, H. M.
Broadfoot, F. C.	Selwood, G. H.
Jackson, E. R.	Swan, W. G.
Johnson, C.	Williams, C. G.
Keefe, W. S. H.	

## HOCKEY.

The trophy which is competed for annually among the Colleges in Hockey is known as the Jennings Cup, and is the gift of W. T. Jennings, Mem., Inst. C. E., Consulting Engineer, Toronto.

## Hockey Club of the School of Practical Science.

## OFFICERS.

Hon. President	Dr. Ellis.
President	S. L. Trees.
Vice-President	I. H. Nevitt.
Sec. and Treas.	C. J. Ingles.
Manager Senior Team	A. M. Campbell.
Manager Junior Team	H. B. Housser.

## LIST OF PLAYERS.

Winners of Jennings Cup, Senior Team.

Barrett, J. H.	MacInnes, J. M.
Broadfoot, F. C.	McKay, C. D.
Evans, H. W.	Montague, F. F.
Gordon, J. M.	Nevitt, I. H.
Harris, C. J.	Pace, G.
Jackson, E. R.	Shirriff, C. H.
Kribs, G.	

## JUNIOR TEAM.

Beck, W. F.	Housser, H. B.
Bothwell, C. C.	Hull, A. H.
Dillabough, G. A.	Jones, G. R.
Fletcher, W.	McKenzie, D. W.
Grasett, C. S.	Ritchie, H. C.
Hall, K.	

## The Toronto Engineer Company.

Major commanding .....	W. R. Lang, Professor of Chemistry, University of Toronto.
Lieut. ....	H. W. Evans.
Lieut. ....	S. P. Biggs.
Lieut. ....	J. G. Fleck.
Company Sgt. Major ....	H. N. Gzowski.
Sgt. ....	N. A. Burwash.
Sgt. ....	J. O'Sullivan.
Sgt. ....	A. E. Davison.
Sgt. ....	W. E. Wickett.
Sgt. on Staff ....	S. B. Wass.
Lance Sgt. ....	J. P. Charlebois.
Signal ....	W. E. Cane.
Quarter Master Sgt. ....	A. Williams.

## Track Club.

President.....	W. R. Worthington.
Vice-President....	T. D. Henderson.
Sec.-Treas.....	L. W. Morden.
IV. Year Rep.....	W. Elwell.
III. Year Rep....	A. Gray.
II. Year Rep. ....	J. P. Charlebois.
I. Year Rep. ....	F. A. McGiverin.

## TRACK TEAM.

W. R. Worthington, W. M. Currie, W. Barber.

SESSION 1903-1904.

STUDENTS IN ATTENDANCE.

FIRST YEAR.

Regular Students.

2	Acton, C. S. ....	Toronto.
3	Amos, W. L.....	Guelph.
1	Arens, A. H... ..	Orillia.
3	Armer, J. C. ....	Chesley.
3	Ash, E. C... ..	Todmorden.
1	Baker, M. H.....	St. Thomas.
3	Barber, F. ....	Toronto.
3	Bavidge, J. H. ....	Toronto.
3	Beck, W. F. ....	Penetanguishene.
5	Beeman, J. J. ....	Sandwich.
1	Bellisle, J. P.....	Toronto.
3	Bertram, T. S. ....	Dundas.
3	Betts, H. H. ....	London.
5	Beynon, D. E.....	Brampton.
3	Bishop, W. J.....	Cryslar.
2	Bissett, G. W. ....	Kincardine.
3	Blackwood, W. C.....	Harriston.
3	Bothwell, C. C.....	Barrie.
1	Brown, T. W.....	Alberton.
1	Bunnell, A. E. K... ..	Brantford.
3	Cameron, A.....	Marmora.
3	Campbell, A. W.....	Melita, Man.
3	Carroll, A. M. ....	Richmond Hill.
1	Carroll, M. J.....	Baltimore.
1	Carruthers, A. L.....	Lucasville.
1	Cavell, E.....	Owen Sound.
3	Christie, F.....	Manchester.
3	Colhoun, G. A... ..	Alvinston.
1	Connery, F.....	Toronto.
1	Cook, A. B.....	Southampton.



## FIRST YEAR.—Continued.

1	Cook, W. A. M.	Toronto.
3	Crawford, A.	Fernhill.
3	Crysdale, C. R.	Northport.
3	Cummer, H. H.	Hamilton.
3	Dawson, G. A.	Mount Forest.
3	Davis, R. S.	Schomberg.
3	Dillabough, G. A.	Morrisburg.
4	Downey, F. C.	Toronto.
3	Dundass, C. S.	Putman.
3	Fear, S. L.	Amherstburg.
3	Fletcher, E. S.	Toronto.
5	Forward, C. C.	Iroquois.
2	Galt, G.	Rossland, B.C.
1	Glendinning, G.	Ailsa Craig.
5	Graham, C. W.	Bradford.
3.	Grasett, C. S.	Barrie.
3	Gray, J.	Port Credit.
1	Greene, P. W.	Orillia.
1	Greene, W. H.	Toronto.
1	Hall, J. H.	Toronto.
3	Hamilton, C. B.	Toronto.
3	Hare, R. A.	St. Catharines.
3	Harkness, A. L.	Iroquois.
1	Harrison, E.	Belleville.
1	Harrison, R. L.	Grimsby.
3	Hartney, J. C.	Toronto.
2	Hassard, E. J.	Mono Mills.
3	Hillis, C. R.	Arkona.
3	Hookway, C. W.	London.
3	Hopkins, R. H.	Lindsay.
1	Houston, R. S.	Emerson, Man.
2	Huber, W.	Bracebridge.
3	Hull, A. H.	Cayuga.
3	Jefferson, L.	Paris.
1	Johnston, C.	Toronto.
1	Jones, G. R.	Brantford.
3	Kay, E. W.	Paris.
3	Kee, I. C.	Stanley's Mills.
1	Keith, H. P.	Comber.

## FIRST YEAR.—Continued.

3	Lamb, G. J.....	Walkerton.
1	Lang, J. L.....	Toronto.
3	Lewis, F. C....	Ingersoll.
1	Lindsay, J. H. ....	Hornby.
3	Linton, A. P. ....	Galt.
3	Macdonald, F.....	Lindsay.
1	Mackay, A. G. ....	Lucknow.
2	MacKenzie, K. A. ..	Toronto.
3	MacLachlan, W. ....	Toronto.
4	McConnell, A. W....	Walkerton.
3	McCully, K. C. ....	Deer Park.
2	McGiverin, F. A... ..	Hamilton.
3	McIlwraith, D. G. ....	Galt.
3	McIntosh, J. J. ..	North Bruce.
1	McKenzie, J. A. ....	Kincardine.
1	McNab, J. V.....	Ayr.
3	Maguire, H. C.....	St. Catharines.
3	Marrs, D. W.....	Beamsville.
3	Meador, C. H. ....	Orillia.
1	Menzies, J. M.....	Staples.
3	Miller, L R. ....	Orillia.
3	Miller, H. M. ....	St. Catharines.
1	Mitchell, B. F... ..	Harriston.
3	Molesworth, G. N.....	Toronto.
1	Murdock, C. R... ..	Brampton.
1	Neelands, E. W. ....	Forest.
1	Parsons, J. E... ..	Fairbank.
5	Peterson, C. A. ....	Toronto.
5	Pettingill, R. E.....	Rose Hall.
3	Phillips, H. E.....	Winnipeg, Man.
1	Phillips, C. S.....	Minden.
3	Pierce, J. W... ..	Quyon, Que.
1	Power, C. W. ....	Toronto.
1	Pringle, H. L. ....	Whitby.
2	Purser, R. C. ....	Windsor.
3	Robertson, N. R. ....	Walkerton.
1	Rogers, C. H. ....	Peterboro.
2	Rolfson, O. ....	Walkerville.
1	Ross, K. G. ....	Toronto.

## FIRST YEAR.—Continued.

1 Routly, H. T. ....	Kirkfield.
2 Ryckman, J. H. ....	Hamilton.
3 Sanders, W. K. ....	St. Thomas.
1 Siebert, F. V. ....	Southampton.
3 Selwood, G. H. ....	Toronto.
3 Silcox, A. B. ....	Winnipeg, Man.
3 Snider, L. ....	Deseronto.
2 Stirret, G. P. ....	Petrolia.
1 Strathy, E. S. G. ....	Toronto.
1 Sutcliffe, H. W. ....	Forest.
3 Tate, N. S. ....	South Monaghan.
1 Taylor, W. C. ....	Hamilton.
1 Thompson, P. M. ....	Picton.
3 Vickery, C. L. ....	Port Perry.
1 Walker, W. J. ....	Toronto.
3 Wilson, J. N. ....	Shanly.
3 Wood, E. M. ....	Cultus.
3 Young, J. ....	Chesley.
3 Young, L. D. ....	Buffalo, N. Y.
3 Zimmer, A. R. ....	Brussels.

## Non Regular Students taking Full Course.

3 Ainlay, W. L. ....	Brussels.
3 Anderson, S. S. ....	Windsor.
3 Arnott, G. C. ....	Toronto.
2 Banting, E. W. ....	Toronto.
2 Bates, M. ....	Chatham.
1 Beardmore, C. O. ....	Toronto.
1 Bevan, W. H. B. ....	Niagara Falls.
1 Bourne, O. B. ....	Winnipeg, Man.
3 Brady, W. S. ....	Toronto.
3 Brandon, H. E. ....	Cannington.
1 Brian, M. E. ....	Windsor.
3 Byam, F. M. ....	Toronto.
3 Campbell, G. A. ....	Millbrook.
3 Chadwick, R. E. C. ....	Toronto.
3 Clendening, C. ....	Walkerton.
2 Cochrane, W. C. ....	Toronto.
4 Creighton, A. G. ....	Dartmouth, N.S.
4 Daniels, W. N. ....	Norristown, Pa.
3 Death, N. P. F. ....	Dixie.

## FIRST YEAR.—Continued.

3	Dill, A. W. ....	Toronto.
3	Doidge, E. H. ....	Lakefield.
2	Fletcher, W. M. ....	St. Catharines.
3	Fraser, R. D. ....	Pilot Mound, Man.
1	Frost, E. A. ....	Norristown, Pa.
1	Grant, L. E. H. ....	Bridgetown, Barbadoes.
3	Hall, K. ....	Penetanguishene.
1	Hanna, D. M. ....	Toronto.
1	Harris, R. C. ....	Hebron, N. S.
3	Hellmuth, H. I. ....	Deer Park.
3	Housser, H. B. ....	Toronto.
1	Hughes, E. V. ....	Newmarket.
1	Hume, F. ....	Wilmer, B.C.
2	Johnston, H. A. ....	Hamilton.
3	Jones, T. ....	Toronto.
3	Keppy, J. D. ....	Spence.
2	Lewis, R. G. ....	Balmy Beach.
3	McCurdy, J. A. D. ....	Toronto.
1	McNeil, I. ....	Walkerville.
3	McPherson, J. A. ....	Bolsover.
1	McQuarrie, M. K. ....	Norman.
3	Martin, H. ....	Toronto.
3	Maxwell, W. A. ....	Windsor.
3	Meador, J. E. ....	Orillia.
2	Murphy, C. J. ....	St. Catharines.
3	Murray, J. D. ....	St. Lucia, B.W.I.
1	O'Brien, J. A. ....	Renfrew.
3	Park, D. G. ....	Chatham.
1	Pearson, A. W. ....	Weston.
3	Pennington, C. H. L. ....	London.
3	Ritchie, H. C. ....	Elmvale.
3	Ryerson, G. C. ....	Toronto.
1	Scott, W. A. ....	Galt.
3	Sewell, R. L. ....	Toronto.
3	Sibley, J. ....	Toronto.
3	Stephens, H. T. ....	Collingwood.
1	Stewart, W. M. ....	Hamilton.
3	Tait, E. L. ....	St. Thomas.
3	Unsworth, W. P. C. ....	Toronto.
1	White, E. V. ....	Burlington.

## SECOND YEAR.

1	Alport, F.	Orillia.
3	Arens, H. W.	Orillia.
3	Armour, R. H.	Lindsay.
3	Aylsworth, C. B.	London.
3	Baldwin, F. W.	Toronto.
1	Barber, W.	Toronto.
2	Begg, W. A.	West Flamboro.
3	Bell, G. G.	Chesley.
3	Blaine, T. R.	Barrie.
1	Boeckh, J. C.	Toronto.
3	Bristol, W. M.	Madoc.
2	Broadfoot, F. C.	Seaforth.
2	Campbell, W. C.	Keene.
3	Carson, W. R.	Carsonby.
3	Chantrell, E.	New Westminster, B. C.
3	Charlebois, J. P.	Toronto.
1	Chase, A. V.	Orillia.
3	Clement, S. R. A.	Churchill.
5	Coleman, R. M.	Toronto.
3	Corrigan, T. E.	Carlisle.
1	Crosby, N. L.	Hebron, N. S.
3	Dowling, F. F.	Harriston.
2	Evans, H. W.	Toronto.
1	Ferguson, G. H.	Toronto.
3	Fierheller, H. S.	Toronto.
3	Fletcher, H. M.	Hamilton.
1	Foster, W. J.	Windsor.
3	Gordon, J. M.	Toronto.
2	Gzowski, H. N.	Toronto.
3	Harrison, F. W.	Hagersville.
1	Hendry, M. C.	Toronto.
1	Henry, E. A.	Kincardine.
2	Hertzberg, C. S. L.	Toronto.
1	Hett, S.	Sutton West.
3	Hewson, W. G.	Niagara Falls.
1	Holmes, O. B.	Selkirk.
2	Horwood, H. O. R.	Toronto.
3	Howard, J. A.	Springvale.

## SECOND YEAR.—Continued.

3	Jepson, W. C.	Niagara Falls.
1	Jones, G. S.	Smith's Falls.
1	Jupp, A. E.	Toronto.
3	Kribs, G.	Hespeler.
1	Latornell, A.	Meaford.
3	Leighton, J. W.	Toronto.
1	Loudon, T. R.	Toronto.
3	MacKenzie, W. D.	Kirkfield.
1	MacInnes, J. M.	Ripley.
2	McDonald, L. C.	Walton.
3	McGorman, S. E.	St. Marys.
1	McGregor, J. M.	Ridgetown.
1	McGregor, W. W.	Glen William.
2	McKenzie, D. W.	Lochalsh.
1	McKinnon, W.	Heatherdale, P. E. I.
3	McLean, C. A.	Frome.
2	McLean, W. N.	Erin.
3	Mace, T. H.	Toronto.
1	Merritt, R. N.	Toronto.
3	Moffatt, R. W.	Bognor.
1	Moore, W. J.	North Gower.
1	Montague, F. F.	Hamilton.
3	Morden, L. W.	Hamilton.
3	Munro, G. R.	Peterboro.
3	Nicklin, W. G.	Grand Rapids, Mich.
1	O'Brien, E. D.	Merrickville.
3	O'Sullivan, J. J.	Toronto.
3	Paterson, G. W.	Belton.
3	Pattee, L. F.	Trenton.
1	Phillips, E. P. A.	Cedar Dale.
2	Pullen, E. F.	Oakville.
1	Rayner, G. W.	Thorold.
2	Ramsey, G. L.	Dunnville.
3	Reynolds, G. B.	Toronto.
3	Richardson, W. L.	Walkerton.
1	Roddick, J. O.	Brantford.
1	Ross, R. C.	Port Robinson.
5	Rothwell, T. E.	Gilford.



## SECOND YEAR.—Continued.

2	Scott, G. S. ....	Toronto.
3	Serson, H. V. ....	Antrim.
3	Shirriff, C. H. ....	Niagara Falls.
3	Sisson, C. E. ....	Peterboro.
1	Smith, F. R. S., B. A. ....	Ingersoll.
1	Southwörth, H. S. ....	Toronto.
1	Stewart, M. A. ....	Toronto.
1	Stewart, L. D. N. ....	Collingwood.
3	Stubbs, W. F. ....	Peterboro.
1	Sturdy, N. H. ....	Buffalo, N. Y.
1	Swan, W. G. ....	Kincardine.
1	Sykes, F. H. ....	Toronto.
3	Thomson, L. R. ....	Toronto.
2	Thomson, J. E. ....	Toronto.
2	Thompson, H. P. ....	Toronto.
3	Tillson, E. D. ....	Tilsonburg.
1	Traill, J. J. ....	Toronto.
1	Treadgold, W. M., B. A. ....	Brampton.
3	Turner, W. E. ....	Orangeville.
3	Uren, A. E. ....	Ingersoll.
3	Vaughan, J. M. ....	Toronto.
1	Wagner, H. L. ....	Toronto.
1	Wallace, W. W. ....	North Gower.
1	Webster, W. G. ....	Oakwood.
1.	Weddell, R. G. ....	Trenton.
5	Wickett, W. E. C. ....	Toronto.
3	Wilkie, J. H. N. ....	Toronto.
1	Wilson, J. M. ....	Toronto.
1	Wright, G. W. A. ....	Toronto.
3	Yeates, P. M. ....	London.

## THIRD YEAR.

3	Alexander, J. H., B.A. ....	Brampton.
3	Barrett, J. H. ....	Port Hope.
1	Beatty, H. E. ....	Toronto.
3	Bonnell, M. B. ....	Bobcaygeon.
3	Brown, T. D. ....	Barrie.
3	Burley, R. J. ....	Regina, Assa.

## THIRD YEAR.—Continued.

3	Burnham, F. W.	Peterboro.
3	Calder, J. W.	Cranbrook.
1	Campbell, A. J.	Collingwood.
1	Cameron, N. C.	Peterboro.
3	Campbell, A. M.	Toronto.
2	Chilver, C. A.	Walkerville.
2	Chilver, H. L.	Walkerville.
1	Christie, U. W.	Chesley.
2	Coates, P. C.	Victoria, B.C.
1	Code, S. B.	Smith's Falls.
1	Code, T. F.	Smith's Falls.
1	Cowan, W. A.	Galt.
3	Craig, S. E.	Snelgrove.
1	Crerar, S. R.	Brussels.
3	Currie, W. M.	Port Perry.
3	Depew, H. H.	Hamilton.
2	Elder, A. J.	Barrie.
2	Fleck, J. G.	Ottawa.
1	Ford, A. L.	Toronto.
3	Gibson, W. S.	Toronto.
1	Goodall, J. N.	Belwood.
1	Gordon, J. P.	Toronto.
3	Gray, A.	Port Credit.
3	Gray, W. W.	Uxbridge.
3	Greenwood, W. K.	Toronto.
1	Hara, L. D.	Merriton.
3	Harris, C. J.	Brantford.
3	Henderson, T. D.	Acton.
1	Heron, J. B.	Scarboro Jet.
1	Hill, E. M. M.	Guelph.
2	Hill, S. N.	St. Thomas.
2	Ingles, C. J.	Toronto.
2	Jackson, E. R.	Seaforth.
1	James, E. A.	Thornhill.
1	Jermyn, P. V.	Toronto.
3	Keefe, W. S. H.	Iroquois.
2	Laing, P. A.	Dundas.
3	McCuaig, O. B.	Toronto.
1	McEwen, G. G.	Moose Creek.

## THIRD YEAR.—Continued.

1	McFarlane, W. G., B. A. ....	Claremont.
3	McGibbon, C. P., B. A. ....	Brampton.
3	McKay, C. D. ....	Maplewood.
1	McMillan, D. ....	Woodville.
3	Manson, G. J. ....	St. Catharines.
3	Milne, W. G. ....	Brown's Corner.
1	Moorhouse, W. N. ....	Toronto.
3	Moore, E. E. ....	Peterboro.
1	Morley, R. W. ....	Hamilton.
3	Munro, W. H. ....	Peterboro.
3	Pace, G. ....	Orillia.
3	Pardoe, W. S. ....	Toronto.
3	Paris, J. ....	White Lake.
2	Parke, J. ....	Oil City.
3	Peaker, W. J. ....	Brampton.
3	Pickering, A. E. ....	Brampton.
1	Raymond, D. C. ....	London.
1	Reid, F. B. ....	Bowmanville.
3	Riddell, M. R. ....	Toronto.
1	Robinson, L. ....	Brockville.
3	Roxburgh, G. S. ....	Norwood.
2	Rutherford, F. N. ....	South Monaghan.
3	Sauder, P. M. ....	Galt.
1	Sheply, J. D. ....	Leamington.
3	Smart, R. S. ....	Toronto.
1	Smith, D. A. ....	Claude.
3	Smither, W. J. ....	Toronto.
3	Slater, F. W. ....	London.
3	Thomson, S. E. ....	Blenheim.
3	Townsend, C. J. ....	Toronto.
1	Townsend, D. T. ....	Woodstock.
1	Trimble, A. V. ....	Toronto.
3	Tucker, B. B. ....	Allanburg.
2	Wade, E. ....	Welland.
1	Walker, E. W. ....	Cayuga.
3	Watson, J. P. ....	Acacia.
1	Weir, J. M. ....	Toronto.
1	Wells, A. F. ....	Sandwich.
1	Worthington, W. R. ....	Toronto.
3	Wright, W. F. ....	Toronto.

## FOURTH YEAR.

Angus, H. H. ....	London.
Conlon, F. T. ....	Thorold.
Coulson, C. L. ....	Welland.
Patten, B. B. ....	St. George.
Edwards, W. M. ....	Iroquois.
Fensom, C. J. ....	Toronto.
Gaby, F. A. ....	Toronto.
Gardner, J. C. ....	Niagara Falls.
Gibson, N. R. ....	Toronto.
Gillespie, P. ....	Toronto.
Hamilton, J. F. ....	Dunedin.
McBride, A. H. ....	Toronto.
McFarlane, J. A. ....	Donegal.
Nevitt, I. H. ....	Toronto.
Oliver, E. W. ....	Toronto.
Pace, J. D. ....	Orillia.
Plunkett, T. H. ....	Meaford.
Smith, H. G. ....	St. Catharines.
Trees, S. L. ....	Toronto.
Wilson, N. D. ....	Toronto.

## Occasional Students.

Bryce, R. A. ....	Toronto.
Hook, A. H. ....	Toronto.
Lee, F. E. ....	Toronto.
Thomson, A., B.A. ....	Bendale.

## PRIZEMEN.

## Engineering.

1879.—	I. Year.	J. McAree	1st prize.
1880.—	II. "	J. L. Morris	1st "
1881.—	I. "	G. H. Duggan	1st "
	II. "	D. Jeffrey	1st "
1882.—	I. "	A. R. Raymer	1st "
	I. "	E. W. Steen	2nd "
	II. "	G. H. Duggan	1st "
	III. "	D. Jeffrey	1st "

## PRIZEMEN.—Continued.

1883.—	I.	Year.	B. A. Ludgate	1st	Prize
	I.	"	A. M. Bowman	2nd	"
	II.	"	A. R. Raymer	1st	"
	II.	"	E. W. Steen	2nd	"
	III.	"	G. H. Duggan	1st	"
1884.—	II.	"	B. A. Ludgate	1st	"
	III.	"	E. W. Stern	1st	"
	III.	"	A. R. Raymer	2nd	"
1885.—	I.	"	A. E. Lott	1st	"
	I.	"	J. Rogers	2nd	"
	II.	"	T. K. Thomson	1st	"
	III.	"	B. A. Ludgate	1st	"
1886.—	I.	"	C. H. C. Wright	1st	"
	I.	"	J. E. Ross	2nd	"
	II.	"	A. E. Lott	1st	"
1887.—	I.	"	H. E. T. Haultain	1st	"
	II.	"	C. H. C. Wright	1st	"
	III.	"	A. E. Lott	1st	"
	III.	"	J. Rogers	2nd	"
1888.—	I.	"	E. B. Merrill	1st	"
	I.	"	F. M. Bowman	2nd	"
	II.	"	D. D. James	1st	"
	III.	"	C. H. C. Wright	1st	"
1889.—	I.	"	J. K. Robinson	1st	"
	I.	"	G. E. Silvester	2nd	"
	II.	"	E. B. Merrill	1st	"
	II.	"	F. M. Bowman	2nd	"
	III.	"	D. D. James	1st	"
1890.—	I.	"	C. Fairchild	1st	"
	II.	"	J. K. Robinson	1st	"
	III.	"	F. M. Bowman	1st	"
	III.	"	E. B. Merrill	2nd	"
1891.—	I.	"	A. J. McPherson	1st	"
	I.	"	R. B. Watson	2nd	"
	II.	"	J. B. Goodwin	1st	"
	III.	"	G. E. Silvester	1st	"
	III.	"	C. W. Dill	2nd	"

## PRIZEMEN.—Continued.

1892.—	I. Year.	.....A. E. Bergey	.....1st Prize.
	I. “	.....R. W. Angus	.....2nd “
	II. “	.....A. J. McPherson	.....1st “
	II. “	.....R. B. Watson	.....2nd “
	III. “	.....E. J. Laschinger	.....1st “
	III. “	.....C. Fairchild	.....2nd “

The Grant of prizes was withdrawn at the close of 1892.

*Architecture.*

The prize in Architecture was the gift of Mr. D. B. Dick, Architect, Toronto.

1891.—	I. Year	.....H. F. Ballantyne.
1892.—	I. “	.....J. A. Ewart.
1893.—	I. “	.....A. H. Harkness.
1894.—	I. “	.....E. A. Forward.
1895.—	I. “	.....W. F. Scott.
1896.—	I. “	.....D. Mackintosh.
1899.—	I. “	.....W. F. Shepherd.

*Civil Engineering.*

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C.E., New York.

1897.—	III Year	.....M. B. Weekes.
1898.—	III. “	.....J. A. Stewart.
1899.—	III. “	.....T. Shanks.
1900.—	III. “	.....E. H. Phillips
1901.—	III. “	.....H. P. Rust.
1902.—	III. “	.....W. F. Ratz.
1903.—	III. “	.....C. R. Young.

*Mechanical and Electrical Engineering.*

Donor, Mr. F. A. Riehle, Philadelphia.

1897.—	III Year	.....A. T. Gray.
1898.—	III. “	.....F. C. Smallpiece.



## UNIVERSITY OF TORONTO.

## Degree of Bachelor of Applied Science (B.A.Sc.).

Date of admission.	Name.	Date of admission.	Name.
1893..	Allison, T. H.	1897 *	Elliott, H. P.
1897 *	Angus, R. W.	1903..	Empey, J. M.
1901..	Ardagh, E. G. R.	1895 *	Ewart, J. A.
1896..	Armstrong, J.	1901..	Foreman, W. E.
1897 *	Bain, J. W.	1903 *	Gagne, S.
1894 *	Ballantyne, H. F.	1903 *	Gibson, A. E.
1901..	Barley, J. H.	1894..	Goodwin, J. B.
1902..	Barrett, R. H.	1899..	Grant, W. F.
1895..	Beauregard, A. T.	1898..	Gray, A. T.
1903..	Blair, W. J.	1901..	Guy, E.
1902 *	Boswell, M. C.	1897 *	Haight, H. V.
1899..	Boyd, W. H.	1900..	Hare, W. A.
1902..	Brandon, E. T.	1897 *	Harkness, A. H.
1903..	Brereton, W. P.	1902..	Harvey, C.
1896..	Brodie, W. M.	1901..	Hemphill, W.
1895..	Bucke, W. A.	1895..	Herald, W. J.
1900..	Burnside, J. T. M.	1901..	Holcroft, H. S.
1898..	Carpenter, H. S.	1896..	Hull, H. S.
1899..	Carter, W. E. H.	1894..	James, D. D.
1903 *	Chace, W. G.	1893..	James, O. S.
1903 *	Chadsey, S. B.	1895 *	Job, H. E.
1898..	Charlton, H. W.	1895..	Johnson, S. M.
1894 *	Chewet, H. J.	1902..	Johnson, J. A.
1903 *	Christie, W.	1896..	Johnson, A. C.
1900 *	Chubbuck, L. B.	1894 *	Keele, J.
1902..	Cockburn, J. R.	1903..	Knight, R. H.
1900..	Coulthard, R. W.	1899..	Korman, J. S.
1903 *	Culbert, M. T.	1894..	Laidlaw, J. T.
1901..	Craig, J. A.	1893..	Laing, A. T.
1901..	Davison, J. E.	1893 *	Laschinger, E. J.
1902..	DeCew, J. A.	1901..	Latham, R.
1901..	Dickson, G. W.	1893 *	Lawson, W.
1901 *	Dixon, H. A.	1893..	Lea, W. A.
1896..	Dobie, J. S.	1894..	McAllister, A. L.
1902 *	Eason, D. E.	1895..	McAllister, J. E.

\*Degree with honors.

## DEGREE OF BACHELOR OF APPLIED SCIENCE.—Concluded.

Date of admission.	Name.	Date of admission.	Name.
1897.	Macallum, A. F.	1903 *	Matheson, P.
1893.	McAree, J.	1893.	McEntee, B.
1896 *	McGowan, J.	1902.	Sauer, M. V.
1896 *	McKinnon, H. L.	1900 *	Shanks, T.
1903.	McMaster, A. T. C.	1895.	Shields, J. D.
1901.	McMillan, J. G.	1899.	Shiple, A. E.
1894 *	McPherson, A. J.	1903.	Sinclair, D.
1895.	McTaggart, A. L.	1902 *	Smallpeice, F. C.
1902 *	McVean, H. G.	1898	Smiley, R. W.
1897.	Macbeth, C. W.	1894 *	Speller, F. N.
1897.	Martin, T.	1894.	Squire, R. H.
1894 *	Merrill, E. B.	1902.	Stevenson, W. H.
1893.	Milne, C. G.	1898 *	Stull, W. W.
1896.	Mines, W. H.	1903.	Sutherland, W. H.
1895 *	Minty, W.	1903	Teasdale, C. M.
1894.	Mitchell, C. H.	1900 *	Tennant, D. C.
1900.	Monds, W.	1901.	Tennant, W. C.
1901.	Neelands, E. V.	1893.	Thomson, R. W.
1901.	Pope, A. S. H.	1901.	Thorne, S. M.
1903 *	Powell, G. G.	1901.	Thorold, F. W.
1902 *	Price, H. W.	1896.	Tremaine, R. C. C.
1900 *	Revell, G. E.	1900.	Wagner, W. E.
1900.	Richards, E.	1898.	Weekes, M. B.
1901.	Roaf, J. R.	1901.	Weir, H. M.
1903.	Robertson, H. D.	1899 *	Williamson, D. A.
1898*	Robinson, A. H. A.	1893 *	Wright, C. H. C.
1902.	Rust, H. P.	1902.	Wright, R. T.
1901.	Saunders, H. W.	1903.	Zahn, H.

## Degree of Civil Engineer (C.E.).

1898.	Alison, T. H.	1893.	Bowman, F. M.
1898.	Ashbridge, W. T.	1892.	Chewett, H. J.
1895.	Bowman, A. M.	1900.	Connor, A. W.
1901.	Francis, W. J.	1898.	Mitchell, C. H.
1900.	Haultain, H. E. T.	1896.	Moore, J. E. A.

\*Degree with honors.

## DEGREE OF CIVIL ENGINEER.—Concluded.

Date of admission. Name.	Date of admission. Name.
1893..Innes, W. L.	1885..Morris, J. L.
1886..Kennedy, J. H.	1892..Thomson, T. K.
1895..McAllister, J. E.	1894..Tyrrell, H. G.
1901..McDowall, R.	1889..Tyrrell, J. W.

## Degree of Mining Engineer (M.E.).

1897.....	Bucke, M. A.
1900.....	Laidlaw, J. T.

## Degree of Mechanical Engineer (M.E.).

1900.....	White, A. V.
1901.....	Johnston, A. C.

## Degree of Electrical Engineer (E.E.).

1896.....	Ross, R. A.
1902.....	Elliott, H. P.
1903.....	Chubbuck, L. B.

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## GRADUATES.

Note.—Graduates are requested to inform the Registrar of changes in their addresses.

1881.

Course.	Name and address.	Occupation.
1.	J. L. Morris, C.E., O.L.S., Pembroke, Ont.	Engineer and Surveyor.

1882.

1.	D. Jeffrey, Windsor, Missouri.	Contractor.
1.	J. H. Kennedy, C.E., O.L.S., Grand Forks, B.C.	Chief Engineer, Vancouver, Victoria & Eastern Ry.
1.	J. McAree, B.A.Sc., D.T.S.	(deceased).

1883.

1.	D. Burns, O.L.S., A.M. Can. Soc. C.E., Pittsburgh, Pa.	West Side Belt R. R. Pittsburg Bank for Savings Building.
1.	G. H. Duggan, M. Can. Soc. C.E., Sydney, N.S.	General Manager, Dominion Iron & Steel Co.
1.	J. W. Tyrrell, C.E., D.L.S., Hamilton, Ont.	Consulting Engineer and Surveyor.

1884.

1.	W. C. Kirkland, New Orleans, La.	Chief Engineer, Drainage Commis- sion of New Orleans.
1.	J. McDougall, B.A., A.M. Inst. C.E., Court House, Toronto, Ont.	York County Engineer.
1.	A. R. Raymer, Pittsburgh, Pa.	Asst. Chief Engineer, P. & L. E. Ry.
1.	James Robertson, O.L.S., Glencoe, Ont.	Engineer and Surveyor.
1.	E. W. Stern, M. Am. Soc. C. E. 1133 Broadway, New York.	Consulting Engineer, Steel Struc- tures, Buildings, etc.

1885.

Course.	Name and address.	Occupation.
1. F. W. Bleakely.....	Sullivan Block, Seattle, W.T.	Civil Engineer.
1. H. J. Bowman, D. & O. L. S.....	M. Can. Soc., C. E., Berlin, Ont.	Consulting Engineer. (County Clerk and Treasurer.)
1. E. E. Henderson, O.L.S.....	Henderson, P.O., Me.	Civil Engineer.
1. B. A. Ludgate, O.L.S.....	Pittsburgh, Pa.	Asst. Engineer, P. & L. E. Ry.
1. O. McKay, O.L.S.....	Walkerville, Ont.	Chief Engineer, Lake Erie and De- troit River Ry.

1886.

1. A. M. Bowman, D.L.S.....	Pittsburgh, Pa.	Engineer, Evansville Contract Co.
1. E. B. Hermon, D. & O.L.S.....	Vancouver, B.C.	Asst. Engineer Vancouver Power Co.
1. Robert Laird, O.L.S.....	North Bay, Ont.	Engineer on Construction, Temiskaming Ry.
1. T. Kennard Thomson, C.E.....	M. Am. Soc. C.E., 13-21 Park Row, New York.	Consulting Engineer.
1. H. G. Tyrrell, C.E.....	A.M. Can. Soc. C.E., Cincinnati, O.	Chief Engineer, The Brackett Bridge Co.

1887.

1. J. C. Burns (deceased).		
1. A. E. Lott.....	Mexico, Mexico.	Consulting Railway Engineer.
1. A. L. McCulloch, O.L.S.....	A. M. Can. Soc. C.E., Nelson, B.C.	City Engineer.
1. F. Martin, M.B. O.L.S.....		Physician.
1. C. H. Pinhey, D. & O.L.S.....	Coteau Landing.	Engineer for contractor, Soulanges Canal.
1. J. Rogers, O.L.S.....	Mitchell, Ont.	Town Engineer.

1888.

Course.	Name and address.	Occupation.
1.	J. F. Apsey, O.L.S..... 115 East Franklin St., Richmond, Va.	With James River Construction Co.
1.	W. T. Ashbridge, C.E..... Edmonton, Alta.	Engineer and Surveyor.
1.	Edward F. Ball..... A.M. Can. Soc. C.E., Room 400, Grand Central Station, New York, N.Y.	Civil Engineer.
1.	D. B. Brown, O.L.S..... Cuidad de Guatemala, Guatemala.	Civil Engineer.
1.	C. M. Canniff..... Toronto.	Engineer, Expanded Metal and Fire-proofing Co.
1.	H. J. Chewett, C.E., B.A.Sc.,..... A.M. Can. Soc. C.E., 83½ York St., Toronto, Ont.	Manager, Siche Gas Co.
1.	J. Gibbons, D. & O.L.S. .... Ottawa, Ont.	Surveying staff, Dep't of Interior.
1.	R. McDowall, O.L.S., C.E..... A.M. Can. Soc. C.E., Owen Sound, Ont.	Town Engineer.
1.	G. W. McFarlen, O.L.S... .. Toronto, Ont.	City Engineer's Staff.
1.	C. J. Marani .. .. . Toronto, Ont.	Broker, Canada Permanent Bldg.
1.	G. R. Mickle, B.A..... Toronto, Ont.	Lecturer in Mining Engineering, School of Practical Science.
1.	J. H. Moore, O.L.S..... Smith's Falls, Ont.	Town Engineer.
1.	G. H. Richardson .. .. . Ottawa, Ont.	Assist. City Engineer.
1.	K. Rose .. .. . 62 William St., New York.	Civil and Mining Engineer.
1.	J. E. Ross, D. & O.L.S..... Kamloops, B.C.	Surveying Staff, Dept. of Interior.
1.	C. H. C. Wright, B.A.Sc..... Toronto, Ont.	Professor of Architecture, School of Practical Science.



1889.

Course.	Name and address.	Occupation.
1.	B. Carey. Toronto, Ont.	
1.	W. J. Chalmers . . . . .	Draftsman, Riter-Conley Mfg. Co. Pittsburgh, Pa.
1.	W. A. Clement . . . . .	Sewer Engineer, Staff of City Engi- neer. A. M. Can. Soc. C.E., Toronto, Ont.
1.	G. F. Hanning. . . . .	Locating Engineer, Can. Northern Winnipeg, Man. Railway.
1.	H. E. T. Haultain, C.E. . . . .	Mining Engineer. M. Can. Soc. C.E., Nelson, B.C.
1.	J. Irvine . . . . .	Engineering Staff, C.P.R. Vancouver, B.C.
1.	D. D. James, B.A. . . . .	Engineer and Surveyor, 227 George B.A.Sc., O.L.S., street. Toronto, Ont.
1.	F. X. Mill (deceased).	
1.	H. K. Moberley . . . . .	District Engineer and Surveyor. Moosomin, Alberta.
1.	T. R. Rosebrugh, M.A. . . . .	Professor in Electrical Engineering, Toronto, Ont. School of Practical Science.
1.	T. Wickett, M.D. . . . .	Physician, Hamilton, Ont. 356 Cannon st. E.

1890.

5.	W. E. Boustead (deceased).	
1.	F. M. Bowman, O.L.S., C.E. . . . .	Structural Engineer, Pittsburgh, Pa. Riter-Conley Mfg. Co.
1.	M. A. Bucke, M.E. (deceased).	
1.	G. D. Corrigan (deceased).	
1.	J. A. Duff, B.A. (deceased).	
1.	A. B. English (deceased).	
1.	N. L. Garland. . . . .	Garland Manufacturing Co. 76 Bay street, Toronto, Ont.
1.	J. Hutcheon, O.L.S. . . . .	City Engineer. Guelph, Ont.
1.	W. L. Innis, O.L.S., C.E. . . . .	Manager, Simcoe Canning Co. Simcoe, Ont.

1890—Continued.

Course.	Name and address.	Occupation.
1. E. B. Merrill, B.A., B.A.Sc...	16 King St., East, Toronto.	Consulting Mechanical and Electrical Engineer.
1. J. R. Pedder (deceased).		
3. R. A. Ross, E.E...	78 St. Francis Xavier St., Montreal, P.Q	Ross & Holgate, Consulting Electrical and Mechanical Engineers.
1. T. H. Wiggins, O.L.S. . . . .	Finch, Ont.	Drainage Engineer.
1. W. J. Withrow. . . . .	Ottawa, Ont.	Patent Examiner, Patent Branch, Dept. of Agriculture.

1891.

1. H. J. Beatty, O.L.S. . . . .	Eganville, Ont.	Engineer and Surveyor.
1. T. R. Deacon, O.L.S. . . . .	Rat Portage, Ont.	Managing Director, Mikado Gold Mining Co.
1. C. W. Dill . . . . .	Toronto, Ont.	Roadways Engineer, Staff of City Engineer.
5. O. S. James, B.A.Sc... . . . .	Toronto, Ont.	Analytical Chemist and Assayer, 227 George St.
1. A. Lane... . . . .	Angus, New Mexico.	Civil Engineer.
1. J. E. McAllister, C.E., B.A.Sc... . . . .	Greenwood, B.C.	Smelting Supt., British Columbia Copper Smelting Works.
3. E. B. Merrill, B.A., B.A.Sc... . . . .	16 King St., East, Toronto	Consulting Mechanical and Electrical Engineer.
1. J. E. A. Moore, C.E... . . . .	Cleveland, O.	Estimating Engineer, Wellman-Seaver & Morgan Engineering Co.
1. W. Newman, O.L.S... . . . .	A.M. Can. Soc. C.E., Windsor, Ont.	City Engineer.
1. J. K. Robinson (deceased).		
1. W. B. Russel. . . . .	North Bay, Ont.	Chief Engineer. Temiskaming & Northern Ry.
1. G. E. Silvester, O.L.S... . . . .	Sudbury, Ont.	DeMorest & Silvester, Civil and Mining Engineers.
1. H. D. Symes. . . . .	Niagara Falls, Ont.	Contractor's Engineer. Ontario Power Co.

1892.

Course.	Name and address.	Occupation.
1. J. R. Allan, O.L.S...	.....	Ranchman.
	Macleod, Alta.	
1. T. H. Alison, B.A.Sc. C.E...	.....	Chief Engineer, Augustes Smith Co.
	39-41 Cortland St., N. York.	
1. A. G. Anderson,		
	Port Dover, Ont.	
1. C. Fairchild, D. & O.L.S...	.....	Surveying Staff, Dept. of Interior.
	Brantford, Ont.	
1. J. B. Goodwin, B.A.Sc...	.....	Asst. Engineer, Electrical Develop-
	Niagara Falls, Ont.	ment Co.
4. C. E. Langley....	.....	Langley & Langley, Architects.
	Mail Bldg., Toronto, Ont.	
1. A. T. Laing, B.A.Sc.....	.....	Registrar,
	Toronto, Ont.	School of Practical Science.
1. E. J. Laschinger, B.A.Sc. . . . .	.....	Asst. Engineer, Consolidated Gold
	Johannesburg,	Fields of South Africa.
	Transvaal, S.A.	
5. W. Lawson, B.A.Sc. ....	.....	Superintendent of the Eaton Sugar
	Eaton, Col.	Company.
3. W. A. Lea, B.A.Sc. (deceased).		
1. B. McEntee, B.A.Sc.		
	28 Queen St. E., Toronto,	
3. C. G. Milne, B.A.Sc... . . . .	.....	Chief Engineer, Hamilton Bridge
	Hamilton, Ont.	Works Co.
1. Chas. H. Mitchell, B.A.Sc.... . . . .	.....	Hydraulic Engineer,
	C.E., M. Can. Soc. C.E.,	Ontario Power Co.
	Niagara Falls, Ont.	
1. N. L. Playfair . . . . .	.....	Superintendent, Playfair Lumber
	Midland, Ont.	Co.
1. J. M. Prentice (deceased).		
1. J. A. Ross.. . . .	.....	Chief Draughtsman L. S. & M. S.
	Cleveland, O.	Ry.
1. Albert N. Smith .....	.....	Superintending Representative of
	330 Main St., Pittsburg, Pa.	Julian Kennedy, Consulting
		Engineer.
1. R. W. Thomson, B.A.Sc. . . . .	.....	Consulting Mining Engineer.
	Johannesburg, Transvaal, S.A.	
3. A. V. White, M.E... . . . .	.....	Mechanical Engineer.
	Toronto, Ont.	

1893.

Course.	Name and address.	Occupation.
1.	J. A. Ardagh... ..	Resident Engineer, C.P.R. Toronto, Ont.
4.	*H. F. Ballantyne, B.A.Sc....	Firm of Ballantyne & Evans, Archi- tects and Engineers, 22 Pine St. New York.
1.	G. L. Brown, O.L.S. ....	County Engineer, Dundas, Stormont and Glengarry. Morrisburg, Ont.
1.	*L. C. Charlesworth .. .	District Surveyor and Engineer for Medicine Hat, Assa. West Assiniboia.
1.	T. H. Dunn .. .	Firm of Dunn & Fullerton, Civil Winchester, Ont. Engineers.
1.	J. M. R. Fairbairn, P.L.S. ....	Resident Engineer, C.P.R. Ottawa, Ont.
4.	*W. Fingald... ..	Architect. 39 Caryl Ave., Yonkers, N.Y.
1.	C. Forester, Toronto, Ont.	
1.	*W. J. Francis, C.E... ..	Engineer of Hydraulic Lift Locks, M. Can. Soc. C.E., Peterboro, Ont. Trent Canal.
3.	*A. R. Goldie....	Manager, Goldie & McCulloch Galt, Ont. Engine Works.
3.	S. C. Hanly .. .	Mechanical Engineer. Midland, Ont.
4.	*J. Keele, B.A.Sc... ..	Geological Survey of Canada. Ottawa, Ont.
1.	J. T. Laidlaw, B.A.Sc., M.E. ..	Firm of McVittie & Laidlaw, Mining Cranbrook, B.C. Engineers and Surveyors.
3.	F. L. Lash... ..	Manager, Batavia Electric Light Co. Batavia, Java.
1.	A. L. McAllister, B.A.Sc.....	Draftsman, 149 Milton St., Brooklyn, N.Y. American Steel Corporation.
1.	T. J. McFarlen .. .	Chief Chemist, Nova Scotia Steel Co. Ferrona, N.S.
1.	*A. J. McPherson, B.A.Sc.....	Mining Engineer & Surveyer. D.L.S., Dawson, Yukon Terr.

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\*Diploma with honors.

1893.—Continued.

Course.	Name and address.	Occupation.
1.	A. F. McCallum, B.A.Sc.... Toronto, Ont.	Lecturer, Toronto Technical School.
1.	W. T. Main .. Baraboo, Wis.	Div. Engineer's Office, Chicago & North Western Ry. Co.
1.	V. G. Marani .. Cleveland, Ohio.	Assistant Engineer Cleveland Gas, Light & Coke Co.
1.	W. Mines, B.A.Sc... Cleveland, Ohio.	With Brown Hoisting Co.
3.	*J. M. Robertson... Montreal, P.Q.	Superintendent, Motor and Repair Dept., Montreal Light, Heat and Power Co.
1.	R. Russel .. North Bay, Ont.	Asst. Chief Engineer Temiskaming Railway.
1.	*F. N. Speller, B.A.Sc... McKeesport, Pa.	Chemist, National Tube Works Co.
1.	R. H. Squire, B.A.Sc., O.L.S. .... Brant Chambers, Brantford, Ont.	Engineer, Ontario Portland Cement Co.
1.	W. V. Taylor, O.L.S. .. A.M. Can. Soc. C.E., Montreal, P.Q.	Engineering Staff, Locomotive and Machine Co., Ltd.
1.	*R. B. Watson... Dawson, Yukon Terr.	Mining Engineer.

1894.

3.	*R. W. Angus, B.A.Sc. ....	Lecturer in Mechanical Engineering, School of Practical Science.
1.	H. F. Barker .....	With Office Specialty Mfg. Co. Toronto.
1.	A. T. Beauregard, B.A.Sc... ..	With the United Gas Improve- ment Co.
1.	A. E. Bergey....	With American Bridge Co., Pittsburgh, Pa. Keystone Branch
3.	D. G. Boyd .....	Draftsman, Public Works Dept. Toronto, Ont.
3.	W. A. Bucke....	With Canadian General Electric Co. Toronto, Ont.

\*Diploma with honors.

1894.—Continued.

Course.	Name and address.	Occupation.
1.	J. Chalmers, O.L.S. . . . . A.M. Can. Soc. C.E., Winnipeg, Man.	Bridge Engineer, Canadian Northern Ry.
4.	*J. A. Ewart, B.A.Sc. .... Ottawa, Ont.	Arnoldi & Ewart, Architects.
3.	W. J. Herald, B.A.Sc. . . . . Sydney, N.S.	With Dominion Iron & Steel Co.
3.	H. E. Job, B.A.Sc. .... Hamilton, Ont.	Manager Toronto and Hamilton Electric Co.
3.	A. C. Johnston, B.A.Sc., M.E. .... Bristol, Pa.	Consulting Mechanical Engineer.
1.	S. M. Johnston, B.A.Sc., P.L.S. .... Greenwood, B.C.	City Engineer.
1.	J. E. Jones . . . . . Pittsburgh, Pa.	Manager, M. H. Treadwell & Co., Engineers, Founders and Ma- chinists.
3.	N. M. Lash. . . . . Montreal, P.Q.	Asst. Electrical Engineer, Bell Telephone Co.
1.	*A. L. McTaggart, B.A.Sc. . . . . McKeesport, Pa.	Draftsman National Tube Works Co.
3.	*W. Minty, B.A.Sc. . . . . Manchester, Eng.	Consulting Engineering Dept., Na- tional Boiler & Gen. Insurance Co.
3.	C. J. Nicholson, Preston, Ont.	
1.	H. Rolph. . . . . Dawson City Yukon Terr.	Mining Engineer.
1.	J. D. Shields, B.A.Sc. .... Toronto, Ont.	Staff of City Engineer.
3.	A. K. Spotton . . . . . Galt, Ont.	With Goldie & McCulloch Engine- Works.
1.	Angus Smith, O.L.S. . . . . Stratford, Ont.	City Engineer.
3.	R. T. Wright, B.A.Sc. . . . . Pittsburgh, Pa.	Draftsman, Westinghouse Machine Co.

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\*Diploma with honors.



1895.

Course.	Name and address.	Occupation.
1.	J. Armstrong, B.A.Sc. . . . .	Locating Engineer, G.T.P. Surveys. Edmonton, N.W.T.
3.	A. E. Blackwood . . . . .	Manager, New York Office, Sulli- 71 Broadway, New York. van Machinery Co.
1.	E. J. Boswell, D.L.S. . . . .	Asst. Engineer C.P.R. Winnipeg, Man.
3.	G. Brebner . . . . .	With General Electric Co. Schenectady, N.Y.
3.	W. M. Brodie, B.A.Sc. . . . .	With the Green Engineering Co. of Pittsburgh, Pa. of Chicago.
3.	L. L. Brown . . . . .	Supt. Foundation and Contracting New York, N.Y. Co., 35 Nassau St.
4.	R. J. Campbell . . . . .	Artist, Chicago Tribune. Chicago, Ill.
3.	A. W. Connor, B.A., C.E. . . . .	Engineering Department Canada Toronto, Ont. Foundry Co.
1.	J. S. Dobie, B.A.Sc., O.L.S. . . . .	Mining Engineer. Bruce Mines, Ont.
1.	F. W. Guernsey . . . . .	Engineer, War Eagle Mining Co. Rossland, B.C.
4.	*A. H. Harkness, B.A.Sc. . . . .	Engineering Dept., Toronto, Ont. Canada Foundry Co.
3.	H. S. Hull, B.A.Sc. . . . .	With Vulcan Iron Works. Wilkes Barre, Pa.
3.	*J. McGowan, B.A., B.A.Sc. . . . .	Lecturer in Applied Mechanics, Toronto, Ont. School of Practical Science.
3.	W. N. McKay . . . . .	With Bank of Hamilton. Hamilton, Ont.
3.	H. L. McKinnon, B.A.Sc. . . . .	With the Brown Hoisting Machine Cleveland, O. Co.
1.	W. W. Meadows, O.L.S. . . . .	Engineering Staff L.E. & D.R. Ry. Walkerville, Ont.
1.	F. J. Robinson, D. & O.L.S. . . . .	District Engineer, Macleod, Alta. Southern Alberta.
3.	F. T. Stocking . . . . .	With Pike's Peake Power Co. Victor, Col.
3.	R. C. C. Tremaine, B.A.Sc. . . . .	(Deceased).

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\*Diploma with honors.

8 S.P.S.

1896.

Course.	Name and address.	Occupation.
2. *J.	W. Bain, B.A.Sc. . . . . Toronto, Ont.	Lecturer in Applied Chemistry, School of Practical Science.
2.	L. T. Burwash . . . . . Stewart River P.O., Yukon.	Mining Recorder, Timber and Crown Lands Agent.
3. *G.	M. Campbell . . . . . Pittsburgh, Pa.	Electrical Engineer, P. & L. E. Ry. Co.
2.	J. A. DeCew, B.A.Sc. . . . . Windsor Mills, P.Q.	Chemist, Canada Paper Co.
3. *H.	P. Elliott, B.A.Sc., M.E. . . . . Pittsburgh, Pa.	Electrical Engineer, Westinghouse Electric and Mfg. Co.
3.	W. C. Gurney . . . . . Toronto, Ont.	Vice-President, Gurney Foundry Co.
3. *H.	V. Haight, B.A.Sc. . . . . Sherbrooke, P.Q.	Engineer, Canadian Rand Drill Co.
1.	W. F. Laing . . . . . Sault Ste. Marie, Ont.	Engineer on Construction, Algoma Central Railway Co.
3.	R. R. Lawrie (deceased).	
3.	C. MacBeth, B.A.Sc. . . . . Detroit, Mich.	Engineering Staff, Michigan Cen- tral Railroad.
3.	J. A. McMurchy . . . . . Pittsburgh, Pa.	With Westinghouse Machine Co.
1.	T. Martin, B.A.Sc. . . . . Port Arthur, Ont.	Engineering Staff, Ontario Rainy River Ry.
3.	R. R. Shipe . . . . . Toronto, Ont.	With Toronto Engraving Co.

1897.

2.	E. Andrews, B.Sc. . . . . Blaenau, Festiniog, N. Wales.	Res. Engineer, Main Offeren Slate Quarry Co.
2. *J.	A. Bow . . . . . Anaconda, Mon.	Draftsman, Washoe Smelter.
1.	H. S. Carpenter . . . . . B.A.Sc., O.L.S., Peterboro, Ont.	Asst. Engineer, Trent Valley Canal.
5.	H. W. Charlton, B.A.Sc. . . . . Ottawa, Ont.	Assistant Analyst at Experi- mental Farm.

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\*Diploma with honors.

## 1897—Continued.

Course.	Name and address.	Occupation.
4. *E. A. Forward . . . . .	Assistant Engineer, A.M. Can. Soc. C.E., Iroquois, Ont.	Galops Canal Enlargement.
3. *A. T. Gray, B.A.Sc. . . . .	With General Electric Co. Schenectady, N.Y.	
3. W. A. B. Hicks . . . . .	With Lackawanna Steel Co. Buffalo, N.Y.	
4. C. F. King. . . . .	Geological Survey of Canada. Ottawa, Ont.	
1. H. W. Proudfoot . . . . .	Engineer and Surveyor. Winnipeg, Man.	
2. *A. H. A. Robinson, B.A.Sc. . . . .	Mine Surveyor, Intercolonial Coal Westville, N.S.	Mining Co., Limited.
4. W. F. Scott. . . . .	Structural Engineer for J. G. How- Berkeley, Cal.	ard, Archt. Univ. of California.
3. *R. W. Smiley, B.A.Sc. . . . .	With Wellman-Seaver & Morgan Cleveland, Ohio.	Engineering Co.
2. *W. W. Stull, B.A.Sc., O.L.S. . . . .	With DeMorest & Silvester, Sudbury, Ont.	Engineers and Surveyors.
1. *M. B. Weekes, B.A.Sc., D.L.S. . . . .	Surveying Staff, Dept. of the Brantford, Ont.	Interior.
1. E. A. Weldon . . . . .	Real Estate Broker. Winnipeg, Man.	

## 1893.

1. W. H. Boyd, B.A.Sc. . . . . Geological Survey of Canada.  
Ottawa, Ont.
2. W. E. H. Carter, B.A.Sc. . . . . Secretary Bureau of Mines.  
Toronto, Ont.
3. E. H. Darling. . . . . With Hamilton Bridge Works Co.  
Hamilton, Ont.
1. W. F. Grant, B.A.Sc. . . . . Town Engineer.  
Sault Ste Marie, Ont.
1. T. S. Kormann, B.A.Sc. . . . . Manager Kormann Brewing Co.  
Toronto, Ont.

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\*Diploma with honors.

## 1898—Continued.

Course.	Name and address.	Occupation.
3.	J. E. Lavrock... .. Hamilton, Ont.	Draftsman International Harvester Co.
4.	D. Mackintosh, B.Arch... .. Baltimore, Md.	Firm of Hoyt & Mackintosh, Architects, 11 East Pleasant St.
1.	F. W. McNaughton, O.L.S... .. Cornwall, Ont.	Town Engineer.
1.	J. H. Shaw, O.L.S... .. North Bay, Ont.	Surveyor.
3.	A. E. Shipley, B.A.Sc... .. Milwaukee, Wis.	Mechanical Engineer, Box 1,097.
3.	*F. C. Smallpiece, B.A.Sc. .... Peterboro, Ont.	With Canadian General Electric Co., Steam Turbine Dept.
1.	R. W. Smith, P.L.S... .. Rossland, B.C.	Surveyor.
1.	*J. A. Stewart, M.A... .. Pittsburgh, Pa.	Estimating and Designing Dept., McClintic-Marshall Construction Co.
1.	*H. L. Vercoe... .. Winnipeg, Man.	Engineering Staff, Can. Northern Ry.
3.	T. A. Wilkinson... .. New York, N.Y.	Electrical Engineer, Ballantyne & Evans, 22 Pine St.
3.	D. A. Williamson, B.A.Sc. .. Hamilton, Ont.	With Hamilton Bridge Works Co.

## 1899.

3.	T. Barber... .. Meaford, Ont.	With Georgian Foundry.
2.	J. T. M. Burnside, B.A.Sc. .... Gold Coast, W. Africa.	Lieut. Gold Coast Reg. W. African Frontier Force.
3.	L. B. Chubbuck, B.A.Sc. .. Pittsburgh, Pa.	Engineering Dept., Westinghouse Electric and Mfg. Co.
2.	G. A. Clothier... .. Rossland, B.C.	Engineer, Le Roi Mining Co.
1.	C. Cooper... .. Carlyle, Assa.	Surveyor.
2.	R. W. Coulthard, B.A.Sc. .... Fernie, B.C.	Chief Chemist, Crow's Nest Pass Coal Co.

\*Diploma with honors.

## 1899—Continued.

Course.	Name and address.	Occupation.
3.	J. A. Craig, B.A.Sc. . . . . . Toronto, Ont.	Office of Delano-Osborne Engineer- ing Co.
2.	J. C. Elliot . . . . . Kelso, Ont.	
3.	W. E. Foreman, B.A.Sc. . . . . . Pittsburgh, Pa.	With the Westinghouse Electric and Mfg. Co.
3.	E. Guy, B.A.Sc. . . . . . Pittsburgh, Pa.	Engineering Dept., Westinghouse Electric and Mfg. Co.
3 *	W. A. Hare, B.A.Sc. . . . . . Buena Vista, Va.	Mechanical Engineer, Virginia Iron Ore Co.
1.	R. Latham, B.A.Sc. . . . . . Hamilton, Ont.	Asst. Engineer, T.H. & B. Ry.
3.	W. Monds, B.A.Sc. . . . . .	Engineering Staff of
3.	A. S. H. Pope, B.A.Sc. . . . . . Toronto, Ont.	Testing Dept. Westinghouse Elec- Willis Chipman, C.E.
1.	J. Patterson, B.A. . . . . . Allahabad, India. Pittsburgh, Pa.	Professor of Physics, Muir Central College. tric & Mfg. Co.
2.	*G. E. Revell, B.A.Sc. . . . . . Montreal, P.Q.	Office of Ross & Holgate, Consulting Engineers.
3.	*E. Richards, B.A.Sc. . . . . . Toronto, Ont.	With Toronto Electric Light Co.
3.	G. A. Saunders. . . . . . Schenectady, N.Y.	With General Electric Co.
1 *	T. Shanks, B.A.Sc., D.L.S. . . . . . Ottawa, Ont.	Topographical Surveys Branch, Dept. of the Interior.
1.	*D. C. Tennant, B.A.Sc. . . . . . Montreal, P.Q.	With Dominion Bridge Co.
3.	W. W. VanEvery . . . . . Lebanon, Pa.	With Lackawana Steel Co.
2.	G. H. Watt, D.L.S. . . . . . Ottawa, Ont.	Topographical Surveys Branch, Dept. of the Interior.
3.	W. E. Wagner, B.A.Sc. . . . . . Toronto, Ont.	Fellow in Mechanical Engineering, School of Practical Science.
3.	E. Yeates. . . . . London, Ont.	With London Machine Tool Co.

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\*Diploma with honors.

1900.

Course.	Name and address.	Occupation.
1.	J. L. Allen . . . . .	Office of Provincial Engineer. Halifax, N.S.
2.	E. G. R. Ardagh, B.A.Sc. . . . .	Fellow in Chemistry, Toronto, Ont. School of Practical Science.
3.	J. A. Bain . . . . .	Structural Dept., S. V. Huber & Pittsburgh, Pa. Co., Constructing Engineers.
3.	J. H. Barley, B.A.Sc. . . . .	With Stanley Electric Mfg. Co. Pittsfield, Mass.
2.	*M. C. Boswell, B.A.Sc. . . . .	Post-Graduate Course, Ithaca, N.Y. Cornell University.
1.	L. T. Bray, D. & O.L.S. . . . .	Surveyor. Amherstburg, Ont.
3.	J. Clark . . . . .	Mechanical Engineer, Grace Mine. Michipicoten Harbor, Ont.
2.	J. E. Davison, B.A.Sc. . . . .	Engineering Staff, Can. Northern Toronto, Ont. Ry.
3.	E. D. Dickinson . . . . .	With General Electric Co. Schenectady, N.Y.
3.	G. W. Dickson, B.A.Sc. . . . .	Mechanical Engineer, Can. Portable Toronto, Ont. Fence Co.
2.	*H. A. Dixon, B.A.Sc., O.L.S. . . . .	Engineering Staff, Winnipeg, Man. Can. Northern Ry.
2.	C. H. Fullerton . . . . .	Firm of Dunn and Fullerton, Winchester, Ont. Civil Engineers.
3.	W. S. Guest . . . . .	Draftsman, Jenckes Machine Co. Sherbrooke, Que.
3.	W. Hemphill, B.A.Sc. . . . .	With Cataract Power and Conduit 40 Court St., Buffalo, N.Y. Co.
3.	S. E. M. Henderson . . . . .	With General Electric Co. Schenectady, N.Y.
3.	J. A. Henry . . . . .	With General Electric Co. Schenectady, N.Y.
2.	H. S. Holcroft, B.A.Sc., D.L.S. . . . .	Surveyor. Toronto, Ont.
3.	H. A. Johnston . . . . .	Mechanical Engineer, Toronto, Ont. 148 Clinton St.
3.	J. C. Johnston . . . . .	City Engineer's Staff. Toronto, Ont.

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\*Diploma with honors.



## 1900—Continued.

Course.	Name and address.	Occupation.
2. *J. A. Johnston, B.A.Sc. ....	Winnipeg, Man.	G.T.P. Ry. Survey.
2. R. E. McArthur ....	Calgary, Assa.	Res. Engineer, C.P.R.
2. J. G. McMillan, B.A.Sc. ....	Toronto, Ont.	Fellow in Mining, School of Practical Science.
3. L. Haun Miller ....	Cleveland, O.	With Wellman-Sever & Morgan Engineering Co.
2. E. V. Neelands, B.A.Sc. ....	Cripple Creek, Colo.	Engineering Staff, Stratton's Independence Mine.
1. *E. H. Phillips, D.L.S. ....	Ottawa, Ont.	Topographical Surveys Branch, Dept. of the Interior.
2. J. R. Roaf, B.A.Sc. ....	Michel, B.C.	Draftsman, Crow's Nest Pass Coal Co.
3. *C. H. E. Rounthwaite ....	Sault Ste. Marie, Ont.	Asst. Superintendent Can. Electro- Chemical Co., Limited.
2. H. W. Saunders, B.A.Sc. ....	Gary, W. Va.	Engineering Dept., U.S. Coal & Coke Co.
1. A. Taylor ....	Winnipeg, Man.	With C.P.R. Land Department.
1. W. C. Tennant, B.A.Sc. ....	Toronto, Ont.	Office of J. McDougall, C.E., York Co. Engineer.
2. S. M. Thorne, B.A.Sc. ....	Crow's Nest, B.C.	Engineer in charge C.P.R. Coal sheds.
1. F. W. Thorold, B.A.Sc. ....	Calgary, Assa.	City Engineer.
1. H. M. Weir, B.A.Sc. ....	Cleveland, O.	With Cleveland Gas, Light and Coke Co.
3. F. D. Withrow ..	Toronto, Ont.	Department of Public Works of Canada.

## 1901.

1. R. H. Barrett, B.A.Sc., O.L.S. ....	Pembroke, Ont.	Office of J. L. Morris, Engineer and Surveyor.
3. W. G. Beatty ....	Fergus, Ont.	Manager, Beatty Bros., Imple- ment Manufacturers.
3. G. M. Bertram ..	71 Broadway, New York.	Office of the Sullivan Machinery Co.

\*Diploma with honors.

## 1901—Continued.

Course.	Name and address.	Occupation.
3.	W. J. Bowers... .. Toronto, Ont.	Office of Willis Chipman, C.E.
3.	E. T. J. Brandon, B.A.Sc. .... Niagara Falls.	Engineering Staff, Ontario Power Co.
3.	W. P. Brereton, B.A.Sc. .... Pittsburgh, Pa.	Draftsman, Heyl & Patterson Mfg. Co.
3.	J. T. Broughton .. .... Pittsburgh, Pa.	Draftsman, Mesta Machine Co.
3.	*W. G. Chace, B.A.Sc. .... Niagara Falls, Ont.	Engineer on Construction, International Ry. Co.
3.	A. G. Christie .. .... Pittsburgh, Pa.	Erecting Engineer, Westinghouse Machine Co.
3.	J. R. Cockburn, B.A.Sc. .... Toronto, Ont.	Fellow in Drawing, School of Practical Science.
1.	W. A. Duff.. .... Grand Crossing, Ill.	Draftsman, The Kenwood Bridge Co.
2.	*D. E. Eason, B.A.Sc..... Peterboro, Ont.	Engineering Staff, Trent Valley Canal.
1.	*S. Gagne, B.A.Sc... .. Toronto, Ont.	Office of W. T. Jennings, C.E., Consulting Engineer.
3.	N. R. Gibson.... .. Toronto, Ont.	Post-graduate Course, School of Practical Science.
1.	C. Harvey, B.A.Sc., D.L.S... .. Indian Head, Assa.	Surveyor.
2.	A. T. E. Hamer .. .... Toronto, Ont.	Managing Director, North Shore Copper & Smelting Co., Ltd.
2.	F. C. Jackson .. .... North Bay, Ont.	Res. Engineer, Temiskaming Ry.
3.	*A. Laidlaw .. .... Toronto, Ont.	Engineering Staff, National Portland Cement Co.
3.	W. C. Lumbers .. .... Toronto, Ont.	Agent, Lee Electric Insole Co.
3.	A. C. Macdougall.. .... Pittsburgh, Pa.	Draftsman, Pittsburgh Reduction Co.
3.	A. T. C. McMaster, B.A.Sc... .. Collingwood, Ont.	Draftsman, Cramp Steel Co.
1.	G. MacMillan .. .... Winnipeg, Man.	Engineering Staff, Canadian Northern Ry.

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\*Diploma with honors.

## 1901—Continued.

Course.	Name and address.	Occupation.
3.	*H. G. McVean, B.A.Sc. .... Toronto, Ont.	Demonstrator in Mechanical Engineering, School of Practical Science.
2.	W. C. Matheson ..... Quebec, Que.	Engineering Staff, G. N. Railway of Canada.
3.	H. T. Middleton ..... Pittsburgh, Pa.	Draftsman, Pittsburgh Reduction Co.
2.	J. L. R. Parsons, B.A.... Toronto, Ont.	Fellow in Surveying, School of Practical Science.
1.	G. H. Power ..... Toronto, Ont.	Office of Willis Chipman, C.E.
3.	*H. W. Price, B.A.Sc. .. Toronto, Ont.	Demonstrator in Electrical Engineering, School of Practical Science.
1.	H. P. Rust, B.A.Sc..... Niagara Falls, Ont.	Engineering Staff, Canadian Niagara Power Co.
3.	M. V. Sauer, B.A.Sc..... Niagara Falls, Ont.	Engineering Staff, Canadian Niagara Power Co.
3.	W. H. Stevenson, B.A.Sc... Chicago, Ill.	General Inspector, Griffin Wheel Co.
1.	R. D. Willson ..... Winnipeg, Man.	Engineering Staff, Canadian Northern.

## 1902.

3.	*H. G. Barber .. Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.
1.	W. J. Blair, B.A.Sc., O.L.S..... New Liskeard, Ont.	Firm of Roberts & Blair, Engineers and Land Surveyors.
3.	J. M. Brown .. Pittsburgh, Pa.	With Westinghouse Machine Co., Steam Turbine Dept.
2.	W. G. Campbell ..... Buffalo, N.Y.	Construction Dept., Lackawanna Steel Co.
2.	A. R. Campbell ..... Sault Ste. Marie, Ont.	Asst. Engineer on Dry Docks.
3.	C. G. Carmichael.... Great Barrington, Mass.	Engineering Department, Stanley Instrument Co.
2.	*W. Christie, B.A.Sc. .. Markerville, Alta.	Asst. to H. W. Selby, D.L.S.

\*Diploma with honors.

## 1902—Continued.

Course.	Name and address.	Occupation.
2.	F. T. Conlon. . . . . Toronto, Ont.	Post-Graduate Course, School of Practical Science.
3.	H. V. Connor. . . . . Pittsburgh, Pa.	With Westinghouse Electric & Mfg. Co.
2.	*M. T. Culbert. . . . . Toronto, Ont.	Class Assistant in Mineralogy, University of Toronto.
2.	R. Cumming. . . . . Port Arthur, Ont.	Engineer for Grant & Co., Con- tractors.
1.	W. E. Douglas, B.A. . . . . Toronto, Ont.	Office of Willis Chipman, C.E. }
3.	*R. J. Dunlop. . . . . Toronto, Ont.	With Canadian Westinghouse Electric Co.
2.	W. M. Edwards . . . . . Toronto, Ont.	Post-Graduate Course. School of Practical Science.
3.	W. Elwell . . . . . Toronto, Ont.	
2.	J. M. Empey, B.A.Sc. . . . . Ottawa, Ont.	Survey's Branch, Dept. of Interior.
2.	*D. L. H. Forbes . . . . . Eveleth, Minn.	Asst. Mining Engineer, Minnesota Iron Co.
1.	*A. E. Gibson, B.A.Sc. . . . . Parry Sound, Ont.	Engineer for Contractor.
3.	A. C. Goodwin . . . . . New Kensington, Pa.	Draftsman, Pittsburgh Reduction Co.
3.	C. Henwood . . . . . Pittsburgh, Pa.	With Edgar Thompson Steel Plant.
3.	D. M. Johnston . . . . . Toronto, Ont.	Manager, Volta Electric Co.
2.	R. H. Knight, B.A.Sc. . . . . Ottawa, Ont.	Topographical Survey's Branch, Dept. of Interior.
5.	*F. L. Langmuir, B.A.Sc. . . . . Universtiy of Freiburg, in Breisgau, Germany	*Post-Graduate Course in Chem- istry.
3.	A. H. McBride. . . . . Toronto, Ont.	Post-Graduate Course, School of Practical Science.
1.	A. L. McLennan . . . . . Toronto, Ont.	Office of J. McDougall, C.E., York Co. Engineer.
3.	J. T. Mackay. . . . . Toronto, Ont.	Student in Faculty of Medicine, University of Toronto.

\*Diploma with honors.

## 1902—Continued.

Course.	Name and address.	Occupation.
3.	J. F. S. Madden.... . Peterboro, Ont.	Erecting Engineering Dept., Can. Gen. Electric Co.
3.	*C. H. Marrs.... . Hamilton, Ont	Draftsman, Hamilton Bridge Works Co.
3.	P. Mathison, B.A.Sc.... . Pittsburgh, Pa.	With Westinghouse Electric & Mfg. Co.
3.	R. S. Mennie .... . Pittsburgh, Pa.	Draftsman, Riter-Conley Mfg. Co.
2.	H. H. Moore .... . Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.
1.	*T. S. Nash .... . Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.
1.	G. G. Powell, B.A.Sc. .... . Toronto, Ont	Inspector, Canadian Niagara Falls Power Co.
1.	*W. F. Ratz .... . Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.
3.	H. D. Robertson, B.A.Sc.... . Pittsburgh, Pa.	With Westinghouse Electric and Manufacturing Co.
3.	*D. Sinclair, B.A.Sc. Stratford, Ont.	Engineering Staff, G. T. Ry.
2.	*I. J. Steele .... . Ottawa, Ont.	Topographical Survey's Branch, Department of the Interior.
3.	W. H. Sutherland, B.A.Sc. .... . Vancouver, B.C.	Electrical Engineer N.W. & B.I. Telephone Co.
3.	*T. Taylor... .. Toronto, Ont.	Structural Department, Canada Foundry Co.
	*Teasdale, C. M... ..1902 Prince Albert, Sask.	Asst. to D. Beatty, D.L.S.
3.	A. A. Wanless .... . Sydney Mines, N.S.	Engineering Staff, Nova Scotia Steel and Coal Co.
3.	H. J. Zahn, B.A.Sc. .... . Pittsburgh, Pa.	Draftsman, Taylor & Dean, 203 Market St.

## 1903.

3.	H. G. Acres .. . Niagara Falls, Ont.	Ontario Niagara Falls Power Co.
3.	H. H. Angus... .. Toronto, Ont.	Post-Graduate Course, School of Practical Science.

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\*Dip'oma with honors.

## 1903—Continued.

Course. Name and address.

3. J. A. Beatty . . . . . Engineering Staff,  
Wilmington, Del.                      Manufacturers' Contracting Co.
3. J. Breslove . . . . . Westinghouse Machine Co.  
Pittsburgh, Pa.
2. J. H. Burd . . . . . Office of J. H. Moore, O.L.S.,  
Smith's Falls, Ont.                      Engineer and Surveyor.
1. E. L. Burgess . . . . . Topographical Survey's Branch,  
Ottawa, Ont.                      Dept. of the Interior.
1. F. F. Clarke . . . . . Office of J. H. Moore, O.L.S.,  
Smith's Falls, Ont.                      Engineer and Surveyor.
2. C. L. Coulson . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
3. A. E. Davison . . . . . Fellow in Civil Engineering,  
Toronto, Ont.                      School of Practical Science.
3. C. J. Fensom . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
2. E. O. Fuce . . . . . Office of M. M. Davis, O.L.S.  
Berlin, Ont.                      1
3. F. A. Gaby . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
3. R. E. George . . . . . Electrical and Gas Engineer,  
Dover, N.H.                      The United Gas & Electric Co.
1. J. C. Gardner . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
1. P. Gillespie . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
1. W. A. Gourlay . . . . . Lindsay and Bobcaygeon Ry.  
Lindsay, Ont.
2. J. F. Hamilton . . . . . Post-Graduate Course,  
Toronto, Ont.                      School of Practical Science.
2. G. S. Hanes . . . . . Office of W. Newman, C.E.  
Windsor, Ont.                      1
5. J. A. Horton . . . . . Pittsburgh Reduction Co.  
Massena, N.Y.
2. F. Y. Harcourt, B.A. . . . . Ontario Niagara Falls Power Co.  
Niagara, Ont.

\*Diploma with honors.



## 1903—Continued.

Course.	Name and address.	Occupation.
1.	L. J. Hayes . . . . . Camden, N.J.	Draftsman, New York Shipbuilding Co.
1.	F. D. Henderson . . . . . Ottawa, Ont.	Topographical Survey's Branch, Dept. of Interior of Canada.
3.	J. G. Jackson . . . . . London, Ont.	
3.	C. K. Johnston . . . . . Winnipeg, Man.	G. T. P. Railways Surveys.
1.	H. Johnston . . . . . Berlin, Ont.	Office of M. M. Davis, O.L.S.
3.	A. G. Lang . . . . . Glen Ridge, N.J.	Edison Storage Battery Co.
1.	A. J. Latornell . . . . . Ottawa, Ont.	Office of Division Engineer, C.P.R.
1.	H. J. McAuslin . . . . . North Bay, Ont.	Assistant to J. H. Shaw, O.L.S.
3.	J. A. McFarlane . . . . . Toronto, Ont.	Post-Graduate Course, School of Practical Science.
1.	A. L. McNaughton . . . . . Ottawa, Ont.	Topographical Survey's Branch, Dept. of the Interior.
5.	F. G. Marriott . . . . . Toronto, Ont.	Lecture Assistant in Chemistry, School of Practical Science.
3.	C. A. Maus . . . . . Glen Ridge, N.J.	Edison Storage Co.
3.	M. L. Miller . . . . . Hamilton, Ont.	Draftsman, International Harvester Co.
2.	R. H. Montgomery . . . . . Ottawa, Ont.	Topographical Survey's Branch, Dept. of the Interior.
1.	F. A. Moore . . . . . Hamilton, Ont.	Office of J. W. Tyrrell, C.E.
3.	E. E. Mullins . . . . . Philadelphia, Pa.	Baldwin Locomotive Works.
3.	I. H. Nevitt . . . . . Toronto, Ont.	Post-Graduate Course, School of Practical Science.
1.	E. W. Oliver . . . . . Toronto, Ont.	Post-Graduate Course, School of Practical Science.

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\*Diploma with honors.



## CERTIFICATES.

### MINERALOGY AND ASSAYING.

Date.	Name and Address.	Occupation.
1896.	G. Johnston . . . . .	
1896.	A. T. Tye.. . . .	
1897.	E. B. Webster . . . . .	
1898.	A. N. McMillan . . . . . Penetanguishene, Ont.	
1900.	A. H. Smith . . . . .	Mining Engineer, Los Reyes Gold Mining & Milling Co.
1901.	G. A. Hunt.. . . .	

### ELECTRICITY.

1896.	E. I. Sifton . . . . .	Manager, London Electric Construc- tion Co.
1903.	W. Elwell . . . . .	Toronto, Ont.

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\*Diploma with honors.

## INDEX TO GRADUATES.

In the following alphabetical list of the Graduates is given the year of graduation of each student. In the preceding list, which is arranged by classes in the order of graduation, may be found additional information as to occupation, addresses, etc.

### A

Acres, H. G. . . . .	1903	Angus, H. H. . . . .	1903
Alison, T. H. . . . .	1892	Apsey, J. F. . . . .	1888
Allan, J. R. . . . .	1892	Ardagh, J. A. . . . .	1893
Allan, J. L. . . . .	1900	Ardagh, E. G. R. . . . .	1900
Anderson, A. G. . . . .	1892	Armstrong, J. . . . .	1895
Andrews, E. . . . .	1897	Ashbridge, W. T. . . . .	1888
Angus, R. W. . . . .	1894		

### B

Bain, J. A. . . . .	1900	Bowman, A. M. . . . .	1886
Bain, J. W. . . . .	1896	Bowman, F. M. . . . .	1890
Ball, E. F. . . . .	1888	Boyd, D. G. . . . .	1894
Ballantyne, H. F. . . . .	1893	Boyd, W. H. . . . .	1898
Barber, H. G. . . . .	1902	Brandon, E. T. J. . . . .	1901
Barber, T. . . . .	1899	Bray, L. T. . . . .	1900
Barker, H. P. . . . .	1893	Brebner, G. . . . .	1895
Barley, J. H. . . . .	1900	Brereton, W. P. . . . .	1901
Barrett, R. H. . . . .	1901	Breslove, J. . . . .	1903
Beatty, H. J. . . . .	1890	Brodie, W. M. . . . .	1895
Beatty, W. G. . . . .	1901	Broughton, J. T. . . . .	1901
Beatty, J. A. . . . .	1903	Brown, J. M. . . . .	1902
Beauregard, A. T. . . . .	1904	Brown, D. B. . . . .	1888
Bergey, A. E. . . . .	1894	Brown, G. L. . . . .	1893
Bertram, G. M. . . . .	1901	Brown, L. L. . . . .	1895
Blackwood, A. E. . . . .	1895	Bucke, M. A. (Deceased) . . . . .	1890
Blair, W. J. . . . .	1902	Bucke, W. A. . . . .	1894
Bleakely, F. W. . . . .	1885	Burd, J. H. . . . .	1903
Boswell, E. J. . . . .	1895	Burgess, E. L. . . . .	1903
Boswell, M. C. . . . .	1900	Burns, D. . . . .	1883
Boustead, W. E. (deceased) . . . . .	1890	Burns, J. C. (deceased) . . . . .	1887
Bow, J. A. . . . .	1897	Burnside, J. T. M. . . . .	1899
Bowers, W. J. . . . .	1901	Burwash, L. T. . . . .	1896
Bowman, H. J. . . . .	1885		

## C.

Campbell, W. G. ....	1902	Christie, A. G. ....	1901
Campbell, A. R. ....	1902	Chubbuck, L. B. ....	1899
Campbell, R. J. ....	1895	Clark, J. ....	1900
Campbell, G. M. ....	1896	Clarke, F. F. ....	1903
Canniff, C. M. ....	1888	Clement, W. A. ....	1889
Carey, B. ....	1899	Clothier, G. A. ....	1899
Carmichael, C. G. ....	1902	Cockburn, J. R. ....	1901
Carpenter, H. S. ....	1897	Conlon, F. T. ....	1902
Carter, W. E. H. ....	1898	Connor, H. V. ....	1902
Chace, W. G. ....	1901	Connor, A. W. ....	1895
Chalmers, W. J. ....	1889	Cooper, C. ....	1899
Chalmers, J. ....	1894	Corrigan, G. D. (deceased) ..	1890
Charlesworth, L. C. ....	1893	Coulson, C. L. ....	1903
Charlton, H. W. ....	1897	Coulthard, R. W. ....	1899
Chewett, H. J. ....	1888	Craig, J. A. ....	1899
Christie, W. ....	1902	Culbert, M. T. ....	1902
		Cumming, R. ....	1902

## D.

Darling, E. H. ....	1898	Dixon, H. A. ....	1900
Davison, J. E. ....	1900	Dobie, J. S. ....	1895
Davison, A. E. ....	1903	Douglas, W. E. ....	1902
Deacon, T. R. ....	1891	Duff, J. A. (deceased) ..	1890
DeCew, J. A. ....	1896	Duff, W. A. ....	1901
Dickson, G. W. ....	1900	Duggan, G. H. ....	1883
Dickinson, E. D. ....	1900	Dunlop, R. J. ....	1902
Dill, C. W. ....	1891	Dunn, T. H. ....	1893

## E.

Eason, D. E. ....	1901	Elwell, W. ....	1902
Edwards, W. M. ....	1902	Empey, J. M. ....	1902
Elliott, H. P. ....	1896	English, A. B. (deceased) ..	1890
Elliot, J. C. ....	1899	Ewart, J. A. ....	1894

## F.

Fairbairn, J. M. R. ....	1893	Forman, W. E. ....	1899
Fairchild, C. ....	1892	Forward, E. A. ....	1897
Fensom, C. J. ....	1903	Francis, W. J. ....	1893
Fingland, W. ....	1893	Fuce, E. O. ....	1903
Forbes, D. L. H. ....	1902	Fullerton, C. H. ....	1900
Forester, C. ....	1893		

## G.

Gaby, F. A... ..1903  
 Gagne, S. ....1901  
 Gardner, J. C.....1903  
 Garland, N. L.....1890  
 George, R. E....1903  
 Gibbons, J.....1888  
 Gibson, A. E.....1902  
 Gibson, N. R....1901  
 Gillespie, P... ..1903  
 Goldie, A. R....1893

Goodwin, A. C.....1902  
 Goodwin, J. B. ....1892  
 Gourlay, W. A... ..1903  
 Grant, W. F.....1898  
 Gray, A. T.....1897  
 Guernsey, F. W... ..1895  
 Gurney, W. C... ..1896  
 Guest, W. S.....1900  
 Guy, E... ..1899

## H.

Haight, H. V... ..1896  
 Hamer, A. T. E.....1901  
 Hamilton, J. F.....1903  
 Hanly, S. C... ..1903  
 Hanes, G. S... ..1903  
 Hanning, G. F. ....1889  
 Harcourt, F. Y., B.A... ..1903  
 Hare, W. A.....1899  
 Harkness, A. H. ....1895  
 Harvey, C... ..1901  
 Haultain, H. E. T... ..1889  
 Hayes, L. J... ..1903  
 Hemphill, W... ..1900

Henderson, E. E... ..1885  
 Henderson, F. D. ....1903  
 Henderson, S. E. M....1900  
 Henry, J. A... ..1900  
 Henwood, C. ....1902  
 Herald, W. J.... ..1894  
 Hermon, E. B.... ..1886  
 Hicks, W. A. B. ....1897  
 Holcroft, H. S. ....1900  
 Horton, J. A... ..1903  
 Hull, H. S... ..1895  
 Hutcheon, J. ....1890

## I.

Innis, W. L... ..1890

Irvine, J... ..1889

## J.

Jackson, J. G... ..1903  
 Jackson, F. C... ..1901  
 James, O. S... ..1891  
 James, D. D. ....1889  
 Jeffrey, D.... ..1882  
 Job, H. E... ..1894  
 Johnston, D. M. ....1902  
 Johnston, H. ....1903

Johnston, A. C... ..1894  
 Johnston, S. M.....1894  
 Johnston, H. A... ..1900  
 Johnston, J. C... ..1900  
 Johnston, J. A... ..1900  
 Johnston, C. K.....1903  
 Jones, J. E... ..1894

## K.

Keele, J... ..1893  
 Kennedy, J. H... ..1882  
 King, C. F... ..1897

Kirkland, W. C... ..1884  
 Korman, T. S... ..1898  
 Knight, R. H.....1902



## L.

Laidlaw, J. T. ....	1893	Lash, N. M. ....	1894
Laidlaw, A. ....	1901	Latham, R. ....	1899
Laing, W. F. ....	1896	Latornell, A. J. ....	1903
Laing, A. T. ....	1892	Lavrock, J. E. ....	1898
Laird, R. ....	1886	Lawson, W. ....	1892
Lane, A. ....	1891	Lawrie, R. R. (deceased) ...	1896
Lang, A. G. ....	1903	Lea, W. A. (deceased) ...	1892
Langmuir, F. L. ....	1902	Lott, A. E. ....	1887
Langley, C. E. ....	1892	Ludgate, B. A. ....	1885
Laschinger, E. J. ....	1892	Lumbers, W. C. ....	1901
Lash, F. L. ....	1893		

## Mac.

MacBeth, C. ....	1896	Maccallum, A. F. ....	1893
MacKay, J. T. ....	1902	Macdougall, A. C. ....	1901
MacMillan, C. ....	1901	Mackintosh, D. ....	1898

## Mc.

McAllister, J. E. ....	1891	McGowan, J. ....	1895
McAllister, A. L. ....	1893	McKay, O. ....	1885
McAree, J. (deceased) ..	1882	McKay, W. N. ....	1895
McArthur, R. E. ....	1900	McKinnon, H. L. ....	1895
McAuslin, H. J. ....	1903	McLennan, A. L. ....	1902
McBride, A. H. ....	1902	McMaster, A. T. C. ....	1901
McCulloch, A. L. ....	1887	McMillan, J. C. ....	1900
McDougall, J. ....	1884	McMurchy, J. A. ....	1896
McDowall, R. ....	1888	McNaughton, A. L. ....	1903
McEntee, B. ....	1892	McNaughton, F. W. ....	1898
McFarlane, J. A. ....	1903	McPherson, A. J. ....	1893
McFarlen, G. W. ....	1888	McTaggart, A. L. ....	1894
McFarlen, T. J. ....	1893	McVean, H. G. ....	1901

## M.

Madden, J. F. S. ....	1902	Middleton, H. T. ....	1901
Main, W. T. ....	1893	Mickle, G. R. ....	1888
Marani, C. J. ....	1888	Merrill, E. B. ....	1890
Marani, V. G. ....	1893	Mennie, R. S. ....	1902
Marriot, F. G. ....	1903	Meadows, W. W. ....	1895
Marrs, C. H. ....	1902	Minty, W. ....	1894
Martin, F. ....	1887	Mill, F. X. (deceased) ....	1889
Martin, T. ....	1896	Miller, L. Haun. ....	1900
Matheson, W. C. ....	1901	Miller, M. L. ....	1903
Mathison, P. ....	1902	Milne, C. G. ....	1892
Maus, C. A. ....	1903	Mines, W. ....	1893

## M.—Continued.

Mitchell, C. H... ..1892	Moore, J. H... ..1888
Moberley, H. K... ..1889	Moore, J. E. A... ..1891
Monds, W... ..1899	Moore, F. A... ..1903
Montgomery, R. H... ..1903	Morris, J. L... ..1881
Moore, H. H... ..1902	Mullins, E. E... ..1903

## N.

Nash, T. S... ..1902	Nevitt, I. H... ..1903
Neelands, E. V... ..1900	Nicholson, C. J... ..1894
Newman, W... ..1891	

## O.

Oliver, E. W... ..1903	Oliver, J. P... ..1903
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## P.

Pace, J. D. ....1903	Philp, D. H... ..1903
Parsons, J. L. R... ..1901	Philips, E. H... ..1900
Patten, B. B... ..1903	Pinhey, C. H... ..1887
Patterson, J... ..1899	Pinkney, D. H... ..1903
Pedder, J. R. (deceased)... ..1890	Playfair, N. L... ..1892
Plunkett, T. H... ..1903	Prentice, J. M. (deceased)... ..1892
Pope, A. S. H... ..1899	Price, H. W... ..1901
Powell, G. G... ..1902	Proudfoot, H. W... ..1897
Power, G. H... ..1901	

## R.

Ratz, W. F... ..1902	Robertson, H. D... ..1902
Raymer, A. R... ..1884	Robertson, J... ..1884
Revell, G. E... ..1899	Robertson, J. M... ..1893
Richards, E... ..1899	Robinson, J. (deceased) ... ..1891
Richardson, G. H... ..1888	Robinson, F. J... ..1895
Roaf, J. R... ..1900	Robinson, A. H. A... ..1897
Rogers, J... ..1887	Ross, J. A... ..1892
Rolph, H... ..1894	Rounthwaite, C. H. E... ..1900
Rose, K... ..1888	Russel, W. B... ..1891
Rosebrugh, T. R... ..1889	Russel, R... ..1893
Ross, J. E... ..1888	Rust, H. P... ..1901
Ross, R. A... ..1890	

## S.

Sauer, M. V... ..1901	Seymour, H. L... ..1903
Saunders, G. A... ..1899	Shanks, T... ..1899
Saunders, H. W... ..1900	Shaw, J. H... ..1898
Scott, W. F... ..1897	Shields, J. D... ..1894

S.—Continued.

Shipe, R. R... ..	1896	Speller, F. N... ..	1893
Shipe, H. M. ....	1903	Spotton, A. K... ..	1894
Shipley, A. E... ..	1898	Squire, R. H... ..	1893
Silvester, G. E... ..	1891	Steel, I. J... ..	1902
Sinclair, D... ..	1902	Stern, E. W... ..	1884
Smallpiece, F. C... ..	1898	Stevenson, W. H... ..	1901
Smiley, R. W. ....	1897	Stewart, J. A... ..	1898
Smith, A. N... ..	1892	Stocking, F. T... ..	1895
Smith, A... ..	1894	Stull, W. W... ..	1897
Smith, H. G... ..	1903	Sutherland, W. H... ..	1902
Smith, R. W... ..	1898	Symmes, A. D... ..	1891
Smith, J. H... ..	1903		

T.

Taylor, T... ..	1902	Thomson, R. W... ..	1892
Taylor, W. V... ..	1893	Thorne, S. M... ..	1900
Taylor, A... ..	1900	Thorold, F. W... ..	1900
*Teasdale, C. M. ....	1902	Trees, S. L... ..	1903
Tennant, D. C... ..	1899	Tremaine, R.C.C. (deceased)	1895
Tennant, W. C... ..	1900	Tyrrell, J. W... ..	1883
Thomson, T. K. ....	1886	Tyrrell, H. G... ..	1886

V.

VanEvery, W. W... ..	1899	Vercoe, H. L... ..	1898
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W.

Waldron, J... ..	1903	Wickett, T... ..	1889
Wanless, A. A... ..	1902	Wiggins, T. H... ..	1890
Wass, S. B... ..	1903	Wilkinson, T. A... ..	1898
Watson, R. B... ..	1893	Williamson, D. A... ..	1898
Watts, G. H... ..	1899	Williams, C. G... ..	1903
Wagner, W. E... ..	1899	Willson, R. D... ..	1901
Weekes, M. B... ..	1897	Wilson, N. D... ..	1903
Weir, H. M... ..	1900	Withrow, W. J... ..	1890
Weldon, E. A... ..	1897	Withrow, F. D... ..	1900
Whelihan, J. A... ..	1903	Wright, C. H. C... ..	1888
White, A. V... ..	1892	Wright, R. T... ..	1894
White, H. F... ..	1903		

Y.

Yeates. E... ..	1899	Young, C. R... ..	1903
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Z.

Zahn, H. J... ..	1902
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